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FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 1 and 25

[IB Docket No. 18-86; FCC 19-81, FCC 20-60; FRS 16772]

Streamlining Licensing Procedures for Small Satellites

AGENCY: Federal Communications Commission.

ACTION: Final rule; announcement of effective date.

SUMMARY: In this document, the Commission is streamlining its rules to facilitate the deployment of a class of satellites known as small satellites, which have relatively short duration missions. The Commission also announces that the Office of Management and Budget (OMB) has approved, for a period of three years, the information collection associated with the revisions to the Commission's rules.

DATES: Effective [INSERT DATE 30 DAYS FROM DATE OF PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Merissa Velez, International Bureau, Satellite Division, at 202-418-0751. For additional information concerning the Paperwork Reduction Act information collection requirements contained in this document, contact Cathy Williams, 202-418-2918, or send an email to PRA@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Report and Order*, IB Docket No. 18-86; FCC 19-81, adopted on August 1, 2019, and released on August 2, 2019. The full text of this document is available on the Commission's website at <https://www.fcc.gov/document/streamlining-licensing-procedures-small-satellites-1>. This document also includes a summary of the Commission's subsequent *Order*, IB Docket No.18-86,

FCC 20-60, adopted on May 8, 2020, and released on May 11, 2020. The full text of this document is available on the Commission's website at <https://www.fcc.gov/document/fcc-adopts-small-satellite-rules-effective-date-clarification-order>.

This document additionally announces that, on February 27, 2020, OMB approved, for a period of three years, the information collection requirements relating to the part 25 rules contained in the Commission's Report and Order, FCC 19-81, also published in this document. The OMB Control Number is 3060-0678. The Commission publishes this document as an announcement of the effective date of the rules. If you have any comment on the burden estimates listed below, or how the Commission can improve the collections and reduce any burdens caused thereby, please contact Cathy Williams, Federal Communications Commission, Room 1-C823, 445 12th Street, SW, Washington, DC 20554. Please include OMB Control Number 3060-0678 in your correspondence. The Commission will also accept your comments via email at PRA@fcc.gov.

Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to fcc504@fcc.gov or calling the Commission's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY).

Synopsis

I. INTRODUCTION

Recent technological innovation has spurred an increasing use of what have been colloquially termed “small satellites” or “small sats” for a wide variety of missions, ranging from short-term experimental missions conducting scientific experiments to longer term commercial communications and remote sensing missions. There are a number of ways of defining small

satellites, but they are most often associated with small size (some based on the “CubeSat” standard¹), short duration missions, and relatively low cost. Many small satellites have been part of government missions, but an ever-increasing number of non-governmental missions by companies, academic institutions, and others have used small satellites. The Communications Act of 1934, as amended, requires the issuance of a license for communications to and from the United States or from any U.S. satellite, and applications requesting a license or authorization to operate with small satellites represent a growing percentage of the number of satellite applications received by the Commission.

We take action to make available a new, optional licensing process for these small satellites. This will enable small satellite applicants to choose a streamlined licensing procedure and thereby take advantage of an easier application process, a lower application fee, and a shorter timeline for review than currently exists for applicants. We will refer to this alternative as the “part 25 streamlined small satellite process.” In so doing, we limit the regulatory burdens borne by applicants and offer potential radiofrequency interference protection for critical communication links, while promoting orbital debris mitigation and efficient use of spectrum. This action will support and encourage the increasing innovation in the small satellite sector and will help preserve U.S. leadership in space-based services and operations.

II. BACKGROUND

The Commission’s part 25 satellite licensing rules, primarily used by commercial systems, group satellites into two general categories—geostationary-satellite orbit (GSO) systems and non-geostationary-satellite orbit (NGSO) systems—for purposes of application

¹ The “CubeSat” design is a standardized interface consisting of approximately 10 cm x 10 cm x 10 cm units. The scalable standard unit specification enables CubeSats to be fully enclosed in specifically developed deployment mechanisms and helps to provide greater access to launch services.

processing.² This categorization is similarly reflected in the Commission's fee structure. As a result, an application for a single commercial NGSO small satellite with a planned two-year mission would be subject to the same application process and fee as an application for an NGSO communications system consisting of hundreds or more satellites to be replenished on a regular basis.

On April 17, 2018 (83 FR 24064 (May 24, 2018)), the Commission released a notice of proposed rulemaking (NPRM or Small Satellite NPRM) proposing to modify the Commission's part 25 satellite licensing rules to create a new category of application specific to small satellites. The Commission sought comment on criteria that would define this new category and proposed that applicants meeting the criteria could take advantage of a simplified application, faster processing, and lower fees, among other things. The proposed streamlined licensing process was developed based on the features and characteristics that typically distinguish small satellite operations from other types of satellite operations, such as shorter orbital lifetime and less intensive frequency use. The NPRM detailed this small satellite procedure, which would serve as an optional alternative to existing procedures for authorization of small satellites. The NPRM also provided background information on the Commission's other processes for licensing and authorizing small satellites, including under the experimental (part 5) and amateur (part 97) rules, although no changes were proposed to either of those parts.

The NPRM also sought comment on topics related to spectrum use by small satellites. The Commission asked for comment on typical small satellite frequency use characteristics, how to facilitate compatibility with Federal operations, use of particular spectrum for inter-satellite

² Under part 25 of the Commission's rules, applications for satellites and satellite systems are filed either as GSO space station applications or NGSO space station or constellation applications. *See, e.g.*, 47 CFR 25.114(a).

links by small satellites, and other issues related to operations by small satellites in frequency bands including the 137-138 MHz, 148-150.05 MHz, and 1610.6-1613.8 MHz bands.

Finally, the NPRM sought comment on the appropriate application fee that would apply to the proposed optional part 25 streamlined process. The Commission proposed a \$30,000 application fee. It noted that any changes to the annual regulatory fees applicable to the small satellites authorized under the streamlined process would be addressed through the separate annual proceeding for review of regulatory fees.

On May 21, 2018 (83 FR 36460 (July 30, 2018)), the Commission adopted its fiscal year (FY) 2018 notice of proposed rulemaking addressing regulatory fees, which sought comment on whether to adopt a new regulatory fee category for small satellites authorized under the proposed streamlined part 25 process, and if a new fee category were to be adopted, what the regulatory fee should be. The Commission adopted its FY 2018 schedule of regulatory fees in a Report and Order on August 28, 2018 (83 FR 47079 (Sept. 18, 2018)) (FY 2018 Report and Order), in which the Commission noted that it was deferring consideration of a new regulatory fee category and the appropriate regulatory fee for small satellites until the Commission adopted a definition of “small satellites” in the instant proceeding.

III. REPORT AND ORDER

A. Adoption of a Streamlined Small Satellite and Small Spacecraft Process

Commenters to the NPRM overwhelmingly support the adoption of a new streamlined licensing process for small satellites within part 25 of the Commission’s rules. Commenters agree that the current part 25 process can be overly burdensome for some companies seeking to launch small satellites into space.

We adopt here a streamlined version of part 25 for small satellite licensing. Applicants

seeking authorization of small satellites can choose to take advantage of this streamlined small satellite process,³ rather than using the other existing applicable licensing procedures. The goal of this small satellite process is to enable satellites that have shorter missions, less intensive spectrum use, and lower risk of producing orbital debris to be licensed on a streamlined basis.

Under the existing regime, some applicants may seek to operate a commercial system under the Commission's experimental licensing program because of the large cost difference between the experimental application fee and part 25 application fee, notwithstanding the fact that the experimental licensing regime is limited to non-commercial uses. The streamlined process adopted here avoids this issue, and is not limited to commercial or non-commercial applications. At the same time, applicants for experimental satellites whose planned operations fall within the scope of part 5 may continue to apply under the part 5 experimental licensing process.

Part 25 licenses and authorizations are typically applied for by commercial systems, and the adoption of this streamlined part 25 process provides increased opportunity for commercial small satellite systems to apply for a part 25 license. In addition, other operators may apply for a streamlined part 25 small satellite license should they choose to do so. For example, an operator with a planned mission to test new technology would have the choice of applying under either part 5 or part 25. If protection of communications links from harmful interference is important to the mission, that operator may choose to apply under part 25. Part 25 also offers the opportunity to provide commercial operations.

Commenters suggest that the Commission clarify how the proposed rules relate to other existing licensing and authorization processes, particularly those under parts 5 and 97 of the

³ Wherever the context is clear, we may simply refer to this process as the "small satellite process."

rules. For example, several commenters questioned whether satellite applicants would be prevented from applying for an experimental license under part 5 once the new part 25 rules are adopted. We emphasize that all of the existing options for satellite authorization will remain available, including the existing part 25, part 5 experimental, and part 97 amateur processes. No changes to those existing processes were proposed in the NPRM, and none are adopted here.

We adopt the NPRM proposal to make streamlined processing available to entities seeking access to the United States market using a non-U.S.-licensed space station, through a petition for declaratory ruling.⁴ The Satellite Industry Association (SIA) and Commercial Smallsat Spectrum Management Association (CSSMA) express support for this proposal, provided that the foreign-licensed satellite or system is subject to the same requirements as U.S. applicants under the streamlined process and applicable reciprocity market-access requirements under the part 25 process. No commenters disagreed with the proposal. Although we use the term “license” at various points in this Order, the streamlined part 25 process will also be made available to applicants seeking U.S. market access, and conclude that such applicants will be subject to the small satellite streamlined process rules, application and regulatory fees under the new fee categories adopted for small satellites,⁵ and the part 25 rules currently applicable to entities requesting to access the United States market using a non-U.S.-licensed space station. We adopt minor revisions to § 25.137 of our rules, addressing non-U.S.-licensed space station application procedures, to add references to the streamlined small satellite process.

⁴ Entities seeking streamlined treatment would file a petition for declaratory ruling, rather than seeking to communicate with a non-U.S.-licensed space station through an earth station application.

⁵ As discussed in further detail *infra*, we are adopting here a new application fee category for small satellites as part of the Commission’s schedule of application fees, and this fee will be applicable to streamlined applicants petitioning for U.S. market access, in order to recover the costs of Commission processing of such applications. Similarly, we are adopting a new regulatory fee category for small satellites, which will include market access grantees.

Some commenters requested that the Commission use terminology other than “small satellite” if the streamlined process includes criteria other than just satellite size. Given the number of criteria described below, it is unclear how all of these criteria could be reflected in a single title for the new streamlined process. As proposed, the rule section specifying the application procedures for the streamlined process, § 25.122, is titled “Applications for streamlined small satellite authorization.” We also adopt a definition of “small satellite” referencing the application rule section. Since all satellites authorized under this process will be small compared to the satellites historically licensed under part 25, we see no need to alter this title. To help avoid any confusion, however, we have referred to this process as the part 25 streamlined small satellite process, to make it clear that this new process is within part 25 of the Commission’s rules.

As discussed below, we also make streamlined processing available to spacecraft with non-Earth orbit missions. Moon Express, Inc., the Commercial Spaceflight Federation, and the CSSMA suggest that if the streamlined process is made available to missions beyond Earth orbit, the Commission consider using the term “spacecraft” or “small spacecraft,” instead of or in addition to the term small satellite. We agree with using the term “small spacecraft” to refer to the space stations that will operate beyond Earth’s orbit, and adopt a corresponding definition.⁶

B. Characteristics of a Satellite or System Qualifying for Streamlined Processing

In the NPRM, the Commission proposed a series of criteria that would define the types of operations that qualify for the small satellite process. The NPRM sought comment on these

⁶ We therefore will refer to the process as the “streamlined small spacecraft process” when discussing an aspect of the streamlined process that would apply uniquely to these missions. Except as specified, *see, e.g.*, section III.B.10, the rules adopted will apply to both streamlined small satellites and streamlined small spacecraft.

proposed eligibility criteria as well as any additional criteria that should be considered.

We received numerous comments on specific eligibility criteria, but almost all commenters agreed with the general proposal to establish a set of criteria to categorize part 25 small satellites for processing. The Boeing Company (Boeing), however, recommends that small commercial satellites, for purposes of the streamlined licensing process, be defined by a “single, controlling characteristic, the nature of their orbital and spectrum sharing rights and obligations.” Boeing believes that so long as the underlying principle that small commercial satellite licensees must, to the extent technically feasible, share orbital and spectrum resources with all other small commercial satellites, the Commission is unlikely to need to adopt many additional regulations governing the characteristics of such satellites. In a later section, we discuss Boeing’s specific comments on the rights and sharing obligations of small satellites licensed under the streamlined process. We do not believe, however, that having a single characteristic regarding orbital and spectrum sharing rights is sufficient to establish the category of systems that may apply under the streamlined process. While the ability to share with other operations is a characteristic that the Commission will review, and an important one from an application processing perspective, the other characteristics proposed in the NPRM and discussed below are also important to ensure that the applications can be reviewed in a timely manner and support some of the benefits of the streamlined process to operators.⁷

We summarize below the characteristics of satellites/systems that we have concluded may be eligible for streamlined processing. These characteristics support processing on a streamlined basis. For example, the demonstration that the requested small satellite operations

⁷ Accordingly, in some instances we anticipate that granting individualized waiver requests of the qualifying criteria would require too much individualized analysis and slow the regulatory process, thereby undermining the purpose of the rule(s).

are compatible with existing operations and do not materially constrain future satellite operations supports exempting these satellites from the Commission's processing round procedures. In the text that follows, we address each of these characteristics/criteria in turn, including the specific rationale for each.

- Ten or fewer satellites under a single license. No limitation on the number of applications that may be filed.
- Maximum in-orbit lifetime of any individual satellite is six years, including time to de-orbit the satellite.
- All operations under a license will be completed within six years.
- Maximum mass of any individual satellite will be 180 kg, including propellant ("wet mass").
- Satellite(s) will be deployed below 600 km altitude or have the capability to perform collision avoidance and de-orbit maneuvers using propulsion.
- Satellite(s) will release no planned debris.
- Satellite operator has assessed and limited the probability of debris being generated due to an accidental explosion resulting from the conversion of energy sources on board the satellite into energy that fragments the spacecraft.
- Probability of in-orbit collision between any satellite and large objects is 0.001 or less as calculated using current National Aeronautics and Space Administration (NASA) software or other higher fidelity model.
- Any individual satellite is 10 cm or larger in its smallest dimension.
- Satellite(s) will have a unique telemetry marker.
- Probability of casualty resulting from uncontrolled atmospheric re-entry of any satellite is

zero, as calculated using current NASA software or other higher fidelity model.

- Licensees must have the capability to eliminate harmful interference when necessary under the terms of the license or other applicable regulations. In particular, satellites must have the capability for immediate cessation of emissions on telecommand.
- Radiofrequency operations will be compatible with existing operations in the requested frequency bands and not materially constrain future operations of other satellites in those frequency bands.

We note that several of these qualifying characteristics overlap with issues discussed in a separate proceeding addressing the Commission's rules on orbital debris mitigation generally—Mitigation of Orbital Debris in the New Space Age. The Commission adopted a notice of proposed rulemaking (84 FR 4742 (Feb. 19, 2019)) (Orbital Debris NPRM) in that proceeding in November 2018 and comments and reply comments were recently filed. The criteria we adopt here are based upon the record developed specifically in the docket for this proceeding. In the event that we reassess certain orbital debris risks as part of the separate, dedicated orbital debris proceeding, these criteria will be modified as necessary or appropriate to conform to rules that would be generally applicable to Commission-authorized space stations, to ensure regulatory congruity.

1. Number of Satellites

We adopt the proposal in the NPRM to limit the number of satellites that can be authorized under an individual streamlined part 25 license to 10. This number has broad support among commenters as a limit on the number of small satellites under a single license. And though Boeing argues we should allow up to 30 satellites in a single application, that would allow a substantially larger constellation (and require a more intensive review) than what most

small satellite applicants appear to desire—and in any event could be functionally achieved by applicants by applying for multiple licenses at the same time.

We also conclude that it is not necessary to place a limitation on the number of streamlined licenses that may be obtained by a single entity because of the other criteria that must be met for an applicant to qualify for streamlined processing. If multiple licenses are sought by the same entity, or an entity and affiliated entities, the Commission will have the opportunity to review each application to see if the proposed operations continue to meet the qualifications for streamlined processing, including, as described below, not materially constraining other operations in the requested frequency band. The grant of one application does not guarantee that subsequent applications will also be granted. We adopt here a requirement that applicants for the streamlined process identify related applications or grants, to help assist the Commission's understanding of a particular system or series of satellites or systems.

CSSMA, Audacy Corporation (Audacy), Analytical Space, the Commercial Spaceflight Federation, and other commenters argue that a limit on the number of streamlined process applications is unnecessary and may stifle innovation. CSSMA, for example, states that ten satellites may not be sufficient for all operators that are developing their technology while engaging commercially with customers, and notes that CSSMA has members that build and/or operate satellites for others and might seek several licenses, one for each system, under the streamlined process. We agree and believe the approach we adopt here—which does not place a limitation on the number of licenses that can be granted to a single entity—will accommodate innovative small satellite system concepts and business models.

Some commenters such as ORBCOMM and SpaceX express concern that applicants could unfairly manipulate the process and create larger satellite constellations that would

otherwise not warrant streamlined treatment. ORBCOMM argues that the Commission should clarify that an applicant cannot file for multiple small satellite system licensees, thereby evading the “more rigorous review of a conventional application.” ORBCOMM, SpaceX, and others further argue that failure to limit a single company from obtaining licenses for multiple systems runs the risk of greater collision and interference issues, thereby rendering streamlined treatment inappropriate. While a theoretical possibility, when viewed in the context of the criteria established for the small satellite licensing process, these concerns are unlikely to be realized in practice. In particular, the six-year orbital lifetime and 600-kilometer maximum altitude (absent propulsion) criteria both correlate with lower collision risk, and the small size of these satellites also correlates with lower risk. Each application will be considered individually and placed on public notice.

What is more, we will require each streamlined process applicant to demonstrate in its application that its proposed operations can co-exist with other operations in the requested frequency band and will not materially constrain future entrants seeking to use the band. If a satellite system begins to amass significant and ongoing operations through a series of streamlined applications, there may come a point at which the scope of those operations will start to materially constrain future entrants seeking to use the same frequency bands, or cause issues in sharing with existing operators, and at that time the Commission would not approve the next additional application for satellites that are conducting those types of operations.

Moreover, there will be an application fee associated with each license application, which after a certain number of licenses will equal the cost of applying for a regular part 25 license. CSSMA argues, for example, that with a \$30,000 application fee, without ability to replenish those satellites, the fees are still substantial, and after a certain number of satellites, become cost

prohibitive as compared to a full part 25 license application, which has a 15-year term. While we recognize there are other benefits to the streamlined process, such as a grace period for the bond, we believe these benefits are unlikely to motivate an applicant to file numerous applications under the streamlined process in a situation where the cumulative filing fees are higher than the application fee for a regular part 25 NGSO system application. So long as the applicant meets the criteria of the small satellite streamlined process, however, we will leave it up to the applicant to decide what approach best fits its business model or desired operational parameters.

To the extent that some commenters raise concerns regarding the number of small satellites in orbit as a general matter, we believe this issue, along with the related issue of the mitigation of orbital debris are better addressed through the Commission's separate proceeding on orbital debris.

By declining to cap the number of satellites that may be applied for by a single entity under the streamlined process, the Commission will also limit the potential for requests to waive any cap on the number of satellites, which would be inconsistent with streamlined processing. Boeing, for example, suggested a limit of 30 satellites per license, but proposed that the Commission consider streamlined applications for modestly more numbers of small satellites if good cause is shown to support a particular business case. It is worth noting that the approach adopted here will avoid this type of particularized analysis or request to waive limits on the number of satellites in a single license, since applicants will be able to apply for another license for additional satellites.

Aside from the comments on limiting the number of licenses than can be obtained under the streamlined process addressed above, we did not receive any additional comments specific to

our proposal that there would be no limit on the number of pending applications or licensed-but-unbuilt systems for streamlined applicants. We adopt the NPRM proposal that no such limits apply.

Transition to Standard Part 25. Several commenters suggest that the Commission establish a transition mechanism for an operator who may wish to build on a larger constellation over time and switch from operating under the streamlined authorization process to the standard part 25 authorization process. We decline to specify a detailed mechanism for transitioning a small satellite license or licenses to a standard part 25 license. However, this would not preclude an operator from, for example, obtaining a license under the small satellite licensing process, and subsequently, during the term of that license, applying for and obtaining a standard part 25 license under which the small satellite would complete the period of operations specified in its original license. The Commission has followed a similar approach involving satellites first licensed for experimental operations, but which later are incorporated into commercial operations under a standard part 25 license. The experimental license is terminated once commercial operations begin. An operator may use information and operational characteristics from its streamlined small satellite operations to inform and support a regular part 25 application, but that application will be analyzed on its own merits, and as part of a processing round where appropriate. We emphasize that operators may apply for a standard license at any time they believe it would be better suited to their operational or business needs.

2. Planned In-Orbit Lifetime

We adopt a slightly modified version of the NPRM proposal, which was that applicants for the part 25 streamlined small satellite process certify that the total in-orbit lifetime is planned to be five years or less, including the time it takes for the satellites to deorbit. We will require

that applicants seeking to use the streamlined process certify that the maximum in-orbit lifetime of any individual satellite in the system will be six years or less, including time to deorbit. While the NPRM proposed a five-year planned orbital lifetime, we find that adding an additional year to the satellite lifetime will provide some additional flexibility, requested by some commenters, while remaining consistent with the short duration nature of a streamlined authorization. As the Commission observed in the NPRM, applicants seeking to operate a small satellite for longer can seek a license or market access grant under our existing part 25 NGSO procedures, which provide for longer license terms.

A number of commenters argue that the five-year limit proposed in-orbit lifetime is too short, particularly where the five years includes the time for the satellite(s) to deorbit. CSSMA, for example, argues that orbital lifetime limits restrict launch opportunities and that an overly conservative limit may make the streamlined process commercially impracticable. CSSMA proposes a limit that leaves sufficient commercially practicable launches available to applicants, and that the in-orbit lifetime should apply on a satellite-by-satellite basis and not to all satellites under a given license, to allow for launch delays, launch spacing, and technology iteration all on one license. Additionally, several commenters urge us to consider the five-year in-orbit lifetime proposal as only including the period of the satellites' active transmission and not the non-transmitting orbital decay period. Other commenters supported the five-year orbital lifetime certification as proposed. These commenters state that the requirement will help minimize the risk of orbital collisions.

While this orbital lifetime certification may narrow the scope of orbital placement options for certain small satellites or shorten a satellite's lifetime more than what the satellite is technologically capable of achieving, the goal of this rulemaking has been to tailor a streamlined

licensing process to a subset of satellite operations—those that are of short duration and present a relatively low risk of creating orbital debris. As noted in the NPRM, the International Telecommunication Union (ITU) has recently identified one to three years to be the typical operational timeline for a CubeSat-type mission of short duration. The planned in-orbit lifetime certification we adopt of six years is twice what the ITU identified and should provide sufficient flexibility for a wide variety of small satellite operations. Adding an additional year to the proposed in-orbit lifetime strikes a balance between providing additional flexibility and helping to ensure that these satellites are out-of-orbit well within accepted international guidelines and that the operational timeline for these satellites is consistent with the relatively short-term spectrum use we intend to facilitate under this process. We disagree with the CSSMA's argument that this lifetime certification would not enable commercial viability for small satellite missions. Although a six-year lifetime limit may rule out a few launch opportunities to higher altitudes that would not correspond to the satellites passively deorbiting within six years, many small satellites currently take advantage of launch opportunities to altitudes from which they do deorbit within six years. Moreover, removal of spacecraft from the environment in a timely manner is an effective means for preventing in-orbit collisions. We find that the benefits of having these streamlined-licensed satellites removed from low-Earth orbit in a timely fashion outweigh any potential costs to operators, particularly where those operators are benefitting from the lower fee and faster processing associated with the streamlined part 25 procedures.

Commercial Spaceflight Federation suggests that where an applicant chooses a satellite design that will have a lifetime beyond five years, the streamlined process allow for a transition to a regular part 25 license for a long-term authorization. We decline to adopt a new transition process specifically to address these circumstances. While we understand the desire among

prospective applicants for maximum operational and launch flexibility, the procedure is designed to cover applications for missions of shorter duration, less intense frequency use and lower risk from an orbital debris perspective, which can be processed in a streamlined fashion under part 25. Operations presenting other characteristics, such as longer duration, are more appropriately processed under a regular part 25 authorization.

The NPRM sought comment on whether a satellite that would not passively deorbit within the proposed in-orbit lifetime could still satisfy the qualifying criteria if it had the capability to maneuver itself to a lower orbit that would ensure re-entry within the proposed lifetime. The certification we adopt is based upon the satellite having a planned in-orbit lifetime of six years, and we conclude this may be achieved by either placing the satellite into an orbit from which it will passively deorbit within six years, or through a satellite design that ensures deorbiting within six years by active means, such as propulsion. In support of the certification, we will require applicants to provide a description of the planned deorbit methodology in the application. This description will support the applicant's certification.

3. License Term

We modify the NPRM proposal slightly to adopt a six-year, rather than five-year license term for satellites authorized through the part 25 streamlined process. This is consistent with the six-year planned satellite lifetime, described above.⁸

As proposed, additional satellites covered by the same license, but launched at a later date, will also fall into the license timeline of the first satellite's placement into orbit. This is

⁸ We clarify that the satellite in-orbit lifetime discussed in the last section applies to each individual satellite, whereas the license term applies to operations under the license. *See, e.g.*, CSSMA Comments at 9. For example, for a constellation of two satellites, if there were only three years left in the license term when the second satellite begins operations, that satellite could be in-orbit for up to six years, including time to deorbit, but would need to cease its operations within three years, consistent with the remaining term of the license.

consistent with the goal of this proceeding to create a streamlined process for short duration operations. Under the rules adopted, operations under any individual license will be limited to six years. We conclude that this shorter license term is commensurate with the shorter, less intensive frequency use that will be licensed in a streamlined fashion. Applicants seeking ongoing operations of a longer duration may consider the standard part 25 license process.

CSSMA proposes that the license term for a streamlined small satellites commence upon “bringing into use the authorized frequencies,” consistent with ITU Radio Regulations Article 11, and not when a “satellite is placed into its authorized orbit,” as proposed in the NPRM. CSSMA is concerned that as proposed, the term of the license would begin to be calculated even where a satellite was rendered non-functional due to launch anomalies. We adopt our proposal in the NPRM with a slight modification so that the license term will be calculated from the time when the first satellite is placed into its authorized orbit and begins operating.⁹

A number of commenters also express concern that launch delays could end up shortening the license term for subsequent satellites in a constellation. We have not adopted a limit on the number of licenses that can be applied for, however. Thus, in instances where there is an unforeseen launch delay that would shorten the operations of subsequent satellites within the original license, an operator can decide whether it makes sense to apply for a new license for those additional satellites or operate them within the remaining term of the initial license.¹⁰

⁹ This is slightly different from CSSMA’s proposal, as it includes operations of the spacecraft using any frequencies, not just particular Commission-authorized frequencies. There may be instances, for example, where a non-U.S.-licensed satellite is operational but has not yet used specific frequencies authorized by the Commission. This satellite would be considered operational for purposes of calculating the license term. A satellite that is non-functional on arrival in orbit will not count toward satisfying the Commission’s milestone requirements, as we describe below. *See infra* section III.F. The one-year grace period for posting of the bond begins thirty days after the license grant is issued.

¹⁰ As with other part 25 licensees, operators of small satellites licensed under the streamlined process must comply with § 25.173 of the Commission’s rules, which includes a requirement to notify the Commission within 15 days after completing in-orbit testing whether a space station’s measured performance is within authorized limits,

Some operators may choose at the outset to seek multiple licenses, each for one satellite operating with a six-year license term. This type of arrangement will give operators more flexibility, while allowing the Commission to assess the proposed operations under each license application in case operations under cumulative licenses begin to fall outside the scope of what was envisioned as part 25 streamlined small satellite operations. Moreover, for coordination and planning purposes, other operators will know that all operations under a particular license will conclude within six years, regardless of whether the applicant has launched additional satellites under the license. We find that this approach is in the public interest, as it combines flexibility for operators with Commission oversight ensuring that all operations authorized in this manner are consistent with criteria of the streamlined process, which is designed for operations of short duration.

SpaceX and Iridium propose proportionally shorter license terms for licensees whose satellites' operational lifetime is of a significantly shorter duration and, in addition to ORBCOMM, raise concerns of increased risk of collision and orbital debris with increased numbers of satellites. In response to these concerns, we first note that the Commission will retain the discretion to specify a shorter license term, pursuant to § 25.121(b) of the Commission's rules, which remains unchanged. Second, in the Orbital Debris NPRM, the Commission sought comment on issues related to orbit selection, including satellites that may remain in orbit for a long period of time relative to the time needed to perform its mission. This issue is not unique to small satellites and will be addressed more fully in the Commission's ongoing orbital debris proceeding. Any requirements adopted there may be made applicable to

whether the space station has been placed in its authorized orbit or orbital location, and whether it is capable of using its assigned frequencies. *See* 47 CFR 25.173. This reporting requirement applies to each licensed satellite.

all applicants, including applicants under parts 5, 25, and 97.

License Extensions and Replacement Satellites. We adopt the proposal in the NPRM that licenses granted under these new rules will be valid only for the original satellite(s) launched and operated by the licensee without the possibility for replacement, e.g., replenishment of a constellation. Several commenters support the NPRM proposal not to permit replacement satellites. CSSMA and other commenters request, however, that the Commission allow an extension process and replacements for the original licensed satellites to account for launch delays or other events outside of the applicant's control. We decline to adopt a process for license extensions on a routine basis for launch delays, for the reasons described above, but we do not rule out the possibility of license extensions in other limited circumstances outside of the control of the applicant, such as a loss of a satellite due to a launch failure. Additionally, we envision that if a satellite is lost due to a documented launch failure, that satellite could be "replaced" within the terms of the license grant.¹¹ Iridium argues that we should consider developing provisions to terminate a license to prevent additional launches of small satellites with designs used in satellites that have previously failed in space. Given the financial incentives that licensees have to ensure that their satellites are functional, we do not find it necessary to adopt a rule specific to the streamlined process that would terminate a license in certain instances related to prior satellite failures. To the extent that Iridium's concern relates to design reliability

¹¹ For example, a particular license might cover launch and operation of up to ten satellites. If one or more of the satellites is lost during a launch failure, those lost satellites would not count toward the total of ten, since they were never launched or operated. Thus, the licensee could still launch additional satellites to replace those that were lost without seeking additional authorization. This would not be a "replacement" satellite as described in § 25.113(i) of the Commission's rules, however, since the license granted by the Commission pursuant to the streamlined small satellite streamlined would not include provision for planned replenishment of the constellation. *See* 47 CFR 25.113(i); Appendix A, Final Rules. As noted in the *NPRM*, in-orbit spares would also not be authorized under a small satellite license. *NPRM*, 33 FCC Rcd at 4166, n.105. *See* 47 CFR 25.113(h); Appendix A, Final Rules.

more generally, however, we note that that issue was raised as part of the Commission's Orbital Debris NPRM, and licenses issued through the small satellite licensing process may be subject to additional requirements based upon the outcome of that proceeding.

4. Deployment Orbit and Maneuverability

We will require that applicants certify that their satellite either will be deployed below 600 km or have sufficient propulsion capabilities to perform collision avoidance maneuvers and deorbit within the six-year in-orbit lifetime. Based on satellite technical characteristics as specified in FCC part 25 and experimental licensing files, 600 km roughly corresponds to the maximum altitude from which it is feasible for a CubeSat or other small satellite to passively reenter Earth's atmosphere within six years. We do not adopt a requirement that small satellites without propulsion capabilities authorized under the streamlined process be deployed from or below 400 km, roughly the altitude of the International Space Station (ISS), at this time. We believe that issues related to all satellites transiting through the ISS orbit—both those licensed under the small satellite licensing process and those authorized under the regular part 25 process—can be better addressed on a more holistic basis in the context of Commission's current orbital debris proceeding.

In the NPRM, the Commission proposed that satellites authorized under the streamlined process would either be deployed to an orbit below 400 km, or have propulsion. A majority of commenters suggested that the proposed certifications regarding deployment were too restrictive and either proposed alternate certifications or suggested that there be no deployment-related certifications as part of the streamlined application process. According to several commenters, the proposed limitations would make the streamlined process of little value to many commercial applicants. Some commenters suggested that there are alternative means for protecting the ISS,

including working with the ISS program as technology develops to determine what should be required of satellites deployed above the ISS. Other commenters support the 400-km certification. Iridium states that without adequate means of maneuverability, there is an increased risk of collision in more congested portions of low-Earth orbit, and suggests that the Commission may wish to require a more significant showing concerning the adequacy of maneuverability and deorbit systems, or process applications to launch small satellites under the standard part 25 licensing procedure. SES/O3b agrees with the proposed certification as well, and notes that other satellite operators may need to expend time and resources assessing the efficacy of alternative means of collision avoidance.

The Commission's initial proposal for a deployment certification would have, in some instances, limited the lifetime of a streamlined-licensed satellite to a period shorter than the certified maximum in-orbit lifetime. Although some commenters support the 400-km standard for certifications, CSSMA notes that even with the originally proposed five-year orbital lifetime, many types of small satellites could go above 400 km and still meet the orbital lifetime requirement with passive or other means. In lieu of 400 km, we therefore adopt a deployment certification that is based on the planned orbital lifetime of these small satellites. This will allow the streamlined small satellites to deploy at altitudes up to where it is feasible that they meet the in-orbit lifetime requirement of six years through passive deorbiting—an altitude of roughly up to 600 km. Of course, the exact altitude can vary widely based on a number of factors, including area-to-mass ratio, orbit, and solar activity, but we find that using 600 km as an upper altitude limit is a useful benchmark for now, which will in many instances be consistent with a six-year in-orbit satellite lifetime. We recognize that there may be some satellites that can deploy above 600 km and still re-enter the atmosphere within six years, but 600 km represents an upper end

that is a useful reference altitude for purposes of streamlined processing. This maximum 600-km deployment certification will give operators more flexibility than the proposed 400-km certification, but will help to ensure that the satellites authorized on a streamlined basis will have relatively short in-orbit lifetimes. Similar to the in-orbit lifetime certification, this deployment certification may rule out some rideshare launch opportunities for small satellites lacking propulsion, if those satellites are licensed under the streamlined process. However, we find that this is a reasonable trade-off to ensure that satellites licensed on a streamlined basis will have a shorter in-orbit lifetime.

In response to those commenters supporting the proposed 400-kilometer certification, we emphasize that as adopted, the streamlined small satellite process will only apply to qualifying applicants that have certified that, among other things, the authorized satellite(s) will deorbit within six years. Applicants will also certify that the risk of in-orbit collision with other large objects is 0.001 or less as calculated using NASA software or other higher fidelity models. These certifications and others applying to streamlined licensees will help to ensure that streamlined-licensed operations are associated with lower risk from an orbital debris perspective, and so we find that adopting a 600-kilometer certification is appropriate at this time for the streamlined process, pending additional discussion as part of the Commission's orbital debris proceeding, which would cover all Commission-authorized satellites.

Additionally, SpaceX asks that the Commission adopt more rigorous certifications for applicants seeking streamlined processing. SpaceX suggests that the Commission require that in order to qualify for streamlined processing, a small satellite applicant must certify that its satellite(s) have sufficient propulsion capabilities to perform collision avoidance maneuvers, regardless of deployment altitude. SpaceX expresses concern that a large number of non-

maneuverable small satellites could present a significant space safety concern for NGSO systems operating at altitudes below the ISS and complicate deployment of any spacecraft that transits through the sub-ISS altitudes, such as satellites destined for higher orbits, as well as manned missions or space tourism activities. According to SpaceX, a “steady rain of uncontrolled deorbiting smallsats” would present a significant collision concern for all of these spacecraft during operations below the altitude of the ISS. We conclude that we do not need to adopt additional, more stringent requirements to protect other operators specifically from streamlined-licensed satellites at this time. These concerns appear to go beyond simply those satellites licensed on a streamlined basis, and instead relate to broader concerns about a safe operating environment in low-Earth orbit (LEO). We conclude that these concerns can also be addressed as part of the Commission’s separate proceeding on orbital debris, which makes a number of proposals and seeks comment on various topics related to safe operations in LEO for all satellites.

In adopting an altitude certification at this time, we will maintain the Commission’s proposal that the small satellites may be deployed above a particular altitude—now 600 km—if the operator certifies that the satellites have sufficient propulsion capabilities to perform collision avoidance maneuvers and deorbit within the in-orbit lifetime term. In the NPRM, the Commission tentatively concluded that more limited maneuvering capabilities, such as those relying primarily on drag, would be insufficient to support deployment at higher altitudes under the streamlined small satellite process, as those methods will likely require closer Commission review. Numerous commenters argue that applicants be provided some flexibility in incorporating maneuverability in their satellite design, without specifically identifying propulsion as a requirement for streamlined small satellites deployed above a particular altitude.

Phase Four, for example, suggests that the Commission use the phrase “mobility” rather than propulsion, since several subsystems work in concert to execute collision avoidance maneuvers, and propulsion systems are not the only types of systems that can change a satellite orbit.

Boeing notes that techniques other than propulsion have been used and are being developed to permit small satellites to proactively maneuver without the use of propulsion, and thus enable collision avoidance. These commenters rightly point out that alternatives to propulsion are available, but do not address the Commission’s concern that these types of methods are likely to require closer Commission review and analysis concerning effectiveness and other issues, which is antithetical to processing these applications on a streamlined basis. For example, while drag augmentation devices may increase the area-to-mass ratio of a space structure and consequently reduce its orbital lifetime, the larger collision cross-section may increase the probability of collision during the orbital decay period. If an operator wishes to undertake operations using these types of technologies above the deployment altitude specified here, then it should consider a regular part 25 authorization or other alternative licensing process where appropriate. We recognize that mobility technologies will continue to evolve, but at this juncture, we find that determining whether a particular satellite does or does not have propulsion is a more effective shorthand for purposes of streamlined processing than analyzing specific satellite maneuverability details. The certification we adopt in this proceeding does not represent a requirement that all small satellites have propulsion, but instead will enable the Commission to process applications on a streamlined basis, with the knowledge that the satellites will generally re-enter Earth’s atmosphere within a short period of time.

Our conclusion regarding the eligibility criteria for this process does not change our view regarding the importance of minimizing disruptions to the ISS and protecting crewed spacecraft.

In the NPRM, the Commission observed that deployment of satellites lacking maneuvering capabilities to orbits from which they will eventually transit through the ISS altitude range increases the likelihood that the ISS will need to conduct avoidance maneuvers, potentially disrupting ISS operations. Accordingly, we adopt the NPRM proposal that applicants under the streamlined process must describe in narrative form the design and operational strategies that will be used to avoid collision with crewed spacecraft. We conclude that adopting a narrative informational requirement will help to ensure that small satellite operators take operations of the ISS and other crewed spacecraft into consideration in planning small satellite activities in orbit.¹² The information provided will also be on the record for evaluation by any interested parties. We also note that the Commission sought comment on issues related to crewed spacecraft in the Orbital Debris NPRM, and will generally address further issues specific to crewed spacecraft in the context of that proceeding.

5. Maximum Spacecraft Size

We adopt the proposal of the NPRM for a maximum mass requirement of 180 kg for any Earth-orbiting satellite that would be authorized under the streamlined process. This upper mass limit is consistent with past small satellite license applications and with NASA demarcation of the small satellite category, as discussed in the NPRM. A number of commenters agree with the mass standard for Earth-orbiting missions.

Other commenters disagreed with the mass proposal or suggested that we should not use mass as a qualifying factor. ORBCOMM suggests that the Commission base its calculation on spectrum and orbit use as opposed to mass. It argues that a satellite with the mass of 180 kg is

¹² For streamlined applicants whose satellite or satellites will have any means of maneuverability, we will also retain the current requirement in part 25 to indicate the anticipated evolution over time of the orbit of the proposed satellite or satellites.

capable of using a large amount of radiofrequency spectrum and could create interference, especially when considering constellations of satellites of this mass. We disagree with this suggestion because the other criteria for small satellites—particularly the requirement that small satellites are compatible with existing operations and will not materially constrain future operations of other satellites in the requested frequency bands—will help to ensure that small satellites can co-exist with other operators.

Boeing and Analytical Space argue that a maximum mass criterion is superfluous and unnecessary considering the other eligibility characteristics set forth in this proceeding. The Commercial Spaceflight Federation suggests using a measurement of the cross-surface section area instead of mass for determining size, arguing this method is more relevant to orbital debris mitigation. We find that this maximum mass characteristic is useful to demarcate a particular type of licensee—a small satellite. Spacecraft are generally grouped according to their mass and mass is also easier to measure in many respects than cross-surface section area, which may change depending on what parts of the spacecraft are deployed following launch. Alongside the other qualifying characteristics, a maximum mass helps to act as a check on the types of operations that may be licensed in a streamlined fashion.

We conclude that 180 kilograms is a good approximation of small satellite size for this purpose, to help filter out any systems that are not appropriate for streamlined processing while allowing for variety in spacecraft design. Consistent with how NASA describes a “small spacecraft” in the document we referenced in the NPRM, we adopt 180 kilograms as a “wet mass” limit, which means that it includes propellant.

6. Trackability

The Commission proposed that applicants under the streamlined process would certify

that each authorized satellite would have physical dimensions greater than 10 cm x 10 cm x 10 cm to ensure trackability and that each satellite would be identifiable by unique telemetry markers allowing it to be distinguished from other space stations or objects. This size is generally consistent with the 1U (one unit) CubeSat form factor and the vast majority of small satellites launched to date have been this size or larger.¹³ All commenters addressing this issue support a trackability requirement, but they disagree on what specifically the requirement should entail. Some commenters argue that rather than minimum dimensions the requirement should be a “functional” trackability requirement, which could allow even smaller satellites to be authorized as technology advances and smaller space objects become more readily trackable. Others argue that the 10 cm x 10 cm x 10 cm requirement should be adopted as a “safe harbor,” but that satellites with smaller dimensions should be permitted if the applicant provides a demonstration of trackability.

We believe that adopting a minimum size for satellites using the streamlined process will help ensure that small satellites are trackable while reducing the time needed to review and process applications. The 18th Space Control Squadron (18 SPCS) acknowledges that it currently tracks objects as small as 1U in size. We therefore adopt a certification requirement that each satellite authorized under the streamlined process must measure no less than 10 cm in its smallest dimension. Consequently, we do not see satisfying this requirement to be a substantial burden on potential applicants under the streamlined process. We note that the certification we adopt is a slight variant on the 10 cm x 10 cm x 10 cm minimum dimensions

¹³ Consistent with the Commission’s proposal to apply a minimum size generally consistent with the stowed CubeSat specification, i.e., 10 cm x 10 cm x 10 cm, we note that the minimum size does not include parts of the spacecraft that must be successfully deployed in order to increase the spacecraft size to the minimum specified for the streamlined process, e.g., deployable antennas.

proposed in the NPRM, and requiring that the satellites be no smaller than 10 cm in their smallest dimension provides slightly more flexibility while achieving the same aim.¹⁴

We are not convinced by commenters who support a “functional” trackability requirement in lieu of adopting minimum dimensions. While we acknowledge that technologies exist that can improve the trackability of spacecraft, we continue to believe that assessing the effectiveness of these technologies will require additional review by the Commission, and that such review is inconsistent with a streamlined licensing process.

We also adopt the Commission’s proposal to require a certification that the spacecraft have unique telemetry markers. We clarify that we expect that when a spacecraft transmits telemetry data to the ground it will include in that transmission some marker that allows the spacecraft to be differentiated from other spacecraft. This signal-based identification marker, which should be different from those of other objects on a particular launch, can assist with identification of a satellite for space situational awareness purposes. Several commenters support the proposal to require unique telemetry markers. University Small-Satellite Researchers and CSSMA seek clarification on the telemetry markers, with CSSMA suggesting that if they are “merely a few bits of information in a satellite’s telemetry it would perhaps not be an undue burden.”

CSSMA further states that it is not clear what interest would be served by being able to distinguish between satellites licensed under the streamlined process and all other space objects—as other licensed satellites would not be distinguishable amongst each other by a unique telemetry marker. As an alternative, CSSMA suggests that the Commission require that all satellites associated with any space station licensee be registered along with their International

¹⁴ A spherical object with a diameter of 10 cm, for example, could still meet this certification.

Designator, as it appears in all Joint Space Operations Center two-line element sets, with the Commission, so that an object and its orbit would be locked together permanently. ORBCOMM and Iridium propose that small satellite operators be required to obtain and share real time ephemeris data with other operators.

To the extent that there are additional technologies or methodologies available that could improve the identifiability of spacecraft, we encourage operators to implement such technologies, but will not require additional certifications at this point for an applicant to be eligible for the streamlined licensing process. We believe the issues raised by ORBCOMM and Iridium relating to sharing of ephemeris data, as well as other additional proposals or methodologies related to identification and new tracking technologies, are better addressed in connection with the Commission's recent NPRM regarding orbital debris mitigation. Although as CSSMA points out, this requirement will not apply to satellites other than those authorized under the streamlined process, we believe that measures to improve the identification of these small satellites are nonetheless appropriate. Again, the Commission is considering these topics as they relate to Commission-authorized satellites more generally, as part of the Orbital Debris NPRM.

7. Casualty Risk

We adopt the certification requirements as proposed in the NPRM regarding casualty risk, specifically that applicants for the part 25 streamlined process certify that their satellite(s) will be disposed of through atmospheric re-entry following conclusion of the mission, and certify that they have conducted a casualty risk assessment using the NASA Debris Assessment Software or another higher fidelity model, and that the assessment resulted in a human casualty risk of zero. Several commenters argued that a "true zero" casualty risk is likely impossible to

achieve. We disagree. There are numerous instances, documented in FCC files, of satellites that can be reliably predicted to burn up completely upon re-entry. We also note, however, that the Commission has accepted methodologies used for assessing debris re-entry casualty risk that consider debris as presenting a casualty risk only if it has a kinetic energy of 15 joules or greater. Zero casualty risk, particularly with this methodology for assessment, is readily achievable for small satellites. This certification is generally consistent with applications that can be processed on a streamlined basis, as it typically indicates that no additional factual inquiry by the Commission or discussion of insurance and liability arrangements, for example, is necessary.

The University Small-Satellite Researchers suggest allowing case-by-case exemptions to the zero-casualty risk requirement for researchers who may need to use certain metals that do not fully disintegrate on re-entry into Earth's atmosphere, so long as they can demonstrate risk mitigation and obtain third-party liability insurance for any potential casualty risk. We believe that the level of analysis that would be required to undertake such review is not consistent with processing on a streamlined basis and decline to adopt such an exemption. Other commenters suggest that the same casualty risk standards should be used for small satellites in this streamlined process that are used for all other satellites and that the adoption of any new standards should be made in a separate rulemaking. As discussed above, we believe a zero casualty risk standard is appropriate for the part 25 streamlined process.

8. Cessation of Emissions

In the NPRM, the Commission sought comment on the proposal to require certification that each satellite has the ability to receive command signals and cease transmission upon receipt of a command. We conclude that applicants must certify that there will be adequate control of radiofrequency operations to immediately eliminate any harmful interference as may be

necessary under the terms of our rules or the space station authorization. In particular, satellites must have the capability for immediate cessation of emissions upon receipt of a telecommand from the ground. The ability to immediately eliminate harmful interference may also require, for some operations, that transmissions are initiated only by ground command, where, for example, there are a limited number of earth stations communicating with the satellite or satellites.

CSSMA proposes that streamlined applicants certify compliance with the Commission's current rule on cessation of emissions, § 25.207, and provide analysis as to how they do so. Section 25.207 states that “[s]pace stations shall be made capable of ceasing radio emissions by the use of appropriate devices (battery life, timing devices, ground command, etc.) that will ensure definition cessation of emissions.” According to CSSMA, this rule already provides a more flexible standard for cessation of emissions and achieves the same end as the proposed NPRM requirement. CSSMA and Boeing suggest that there are more reliable approaches to cessation of emissions than ground transmitting commands and argue that it may be appropriate to permit a small satellite to transmit for a certain period of time and refrain from resuming transmissions until the satellite receives another affirmative command from a ground station. SES/O3b does not object to retaining § 25.207 in its current state, but opposes further requirements that would prohibit transmissions absent an active command, instead suggesting that it is more important to know that under any failure mode the satellite will cease transmission after a certain period.

We note that § 25.207 of the Commission's rules has not been updated since it was adopted in 1965 and varies slightly from the current ITU Radio Regulation No. 22.1, which states that “[s]pace stations shall be fitted with devices to ensure immediate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of

these Regulations.” We are not modifying § 25.207 as a general matter in this proceeding. However, we find that it is appropriate to require that small satellites licensed under the streamlined process have the capability to immediately eliminate harmful interference when necessary, which must include the ability to cease radio emissions by telecommand. Depending on the system design, other means may also be necessary to ensure the immediate elimination of harmful interference, such as those described by CSSMA and Boeing, and operators should design their systems accordingly in order to satisfy the qualifying criterion for streamlined processing, although we will not prescribe specific designs.

We thus do not adopt the NPRM proposal that applicants in all instances operate via a “passively safe” system. We conclude that this broader standard of eliminating harmful interference allows for design flexibility alongside the backstop requirement to cease emissions by telecommand. The ability to eliminate harmful interference is important in any system, and particularly so in these systems which must share with existing operators and not materially constrain future operators in any particular frequency band.

9. Streamlined Small Spacecraft Process

We adopt the NPRM proposal to allow small spacecraft with planned non-Earth orbiting missions, such as commercial lunar missions, to file under the streamlined process. All commenters addressing the issue support the inclusion of a small spacecraft streamlined licensing process. Commenters provided various suggestions for changes to the eligibility requirements for the streamlined process in order to allow for successful small spacecraft missions while maintaining a streamlined administrative process. These suggestions include increasing the maximum mass, allowing deorbit by means other than atmospheric re-entry, and increased operational lifetimes.

Based on the record, we conclude that it is appropriate to exempt small spacecraft with planned non-Earth orbiting missions from several of the certifications required for most applicants under the streamlined process and make modifications to others. Specifically, applicants for these missions will be exempt from the certifications regarding disposal by atmospheric re-entry and deployment altitude. While we will not require a qualifying certification related to spacecraft disposal by atmospheric re-entry, we will ask that applicants for a streamlined small spacecraft license provide a brief description of their disposal plan, since there are multiple potential disposal scenarios. In addition, we modify the mass certification to specify a maximum mass for these spacecraft, including fuel, of 500 kilograms. This is consistent with the comments we received suggesting that we adopt a higher mass limit for non-Earth-orbiting small spacecraft systems.

We also received comments proposing that spacecraft applying under the small spacecraft streamlined process be subject to different license terms, for example, 10 or 25 years. SIA, on the other hand, proposed that there should not necessarily be different license terms for non-Earth-orbiting missions, as such missions are limited by component life, the deep space environment, and the initial launch trajectory. It is unclear whether such non-Earth-orbiting missions would in fact need a longer license term, and so we decline to adopt a different license term or spacecraft lifetime certification for small spacecraft at this time, and apply a maximum six-year license term. This maximum six-year license term and spacecraft lifetime, as described above, can be considered generally commensurate with short duration operations.¹⁵ We may revisit this topic in the future once we have additional experience authorizing these missions, but at this time missions seeking longer license terms may apply under the Commission's other

¹⁵ We reserve the right to issue a license with a shorter license term for planned operations of less than six years.

existing licensing processes.

10. Operational Debris and Collision Risk

In the NPRM, the Commission proposed that applicants for the streamlined process certify (1) that their satellite(s) will release no operational debris; (2) that the satellite operator has assessed and limited the probability of accidental explosions, including those resulting from the conversion of energy on board the satellite into energy that fragments the spacecraft; and (3) that the probability of an in-orbit collision between each satellite and any other large object¹⁶ during the orbital lifetime of the space station is less than 0.001.

With respect to the first two certifications—release of operational debris and accidental explosions—all the commenters addressing these topics agreed with the proposed certifications. We therefore adopt the certifications as proposed in the NPRM, limiting eligibility for the streamlined licensing process to those satellites that release no operational debris during mission lifetime and requiring a certification from applicants that the satellite operator has assessed and limited the probability of accidental explosions, including those resulting from the conversion of energy sources on board the space station into energy that fragments the spacecraft. The NPRM also sought comment on whether a certification alone was adequate with respect to the probability of accidental explosions or on whether there may be circumstances in which a more detailed disclosure and review is appropriate. We did receive some comments relevant to this question of what demonstrations should be submitted to the Commission, specifically whether an Orbital Debris Assessment Report should be included with each streamlined application, and

¹⁶ A “large object” will be considered to be a space object larger than 10 cm in diameter. *See* NASA Standard at 4.5-1. NASA’s Debris Analysis Software, for example, will calculate probability of accidental collision with space objects larger than 10 cm in diameter. *See* NASA Orbital Debris Program Office, Debris Assessment Software User’s Guide, Version 2.1 at 3.5 (October 2016).

those comments are addressed in the section of this Order on application requirements.

We also adopt the third proposed applicant certification on this topic, specifically that the probability of each satellite's risk of in-orbit collision with large objects is less than 0.001, noting that this certification is consistent with the technical guidance developed by NASA for its space missions. In the NPRM, we sought comment on whether the 0.001 metric was appropriate for satellites under the streamlined process, or whether a more stringent standard may be appropriate. A number of commenters agreed with a 0.001 probability of risk of in-orbit collision certification proposed in the NPRM. CSSMA agrees with the 0.001 risk of collision certification, but argues that the Commission should adopt this certification in lieu of limiting the orbital altitude or requiring propulsive capability. As described in the previous sections, the orbital altitude certification, and corresponding certification that streamlined-licensed satellites above that altitude must have propulsion, help to ensure that the operations authorized under the streamlined process are limited in duration and that the satellites will not remain in low-Earth orbit for long periods of time following the end of their useful lives. Although a low collision risk as calculated using available modeling tools is an important part of orbital debris mitigation, the other qualifying criteria we adopt also decrease the probability that such spacecraft will contribute to the creation of orbital debris, consistent with the public interest in the continued viability of operations in LEO.

In its comments, ORBCOMM suggests that there should be updates to the Commission's rules more broadly on the topic of orbital debris and space traffic management. "Given the limits of using models to forecast potential collision risks," ORBCOMM states, the Commission should adopt robust space traffic management obligations that would apply to small satellite system operators and other NGSO satellite system operators. The Center for Space Standards

and Innovation (CSSI) suggests that we consider reviewing the risk of collision in aggregate, rather than for each individual satellite. As noted, subsequent to the release of the Small Satellite NPRM, the Commission adopted the Orbital Debris NPRM, seeking comment on a wide variety of topics related to orbital debris and operations under part 25, among other things. The issues raised by both CSSI and ORBCOMM are discussed more broadly in the Orbital Debris NPRM. For purposes of this proceeding, we therefore adopt the certification regarding satellite risk of in-orbit collision with large objects as it was proposed in the NPRM, including that the certification will be on an individual satellite basis. This certification for streamlined small satellites may be modified, however, based on the outcome of the Orbital Debris NPRM.

11. Other Characteristics

Scope of Frequency Use. In the NPRM, the Commission sought comment on the typical frequency use characteristics of small satellites that would be authorized under the proposed streamlined process, and on the type and quantity of spectrum that would be needed for small satellites to operate and the extent to which transmissions requiring larger bandwidth could be conducted via inter-satellite links or alternatives such as optical links. CSSMA responded to the Commission's inquiry with fairly extensive information regarding typical current and future frequency use characteristics of small satellites, based on what it describes as its own internal review, taking into consideration its members' business plans and experiences. SpaceX suggests that we consider specifying bandwidth and power limits for systems seeking streamlined consideration to correspond with the expectations expressed by the Commission in the NPRM. Also, ORBCOMM suggests that the Commission should consider establishing a streamlined processing qualification envelope based more concretely on spectrum and orbit use.

We do not find that it is necessary, however, even given the potential capabilities of a 180

kg satellite and some of the upper ranges of data rates, power levels, and bandwidths described by CSSMA, to adopt generalized limitations on spectrum use for streamlined small satellites, other than the sharing requirements that have already been described. Contrary to the suggestions of SpaceX and ORBCOMM, we believe the other qualifying criteria of the streamlined process are sufficiently rigorous even without a limitation on bandwidths or power levels. Specifically, concerns regarding potential interference from a streamlined applicant, such as those expressed generally by ORBCOMM, can be addressed through the application process described, wherein an applicant must certify and describe how its operations can share with existing operations in the requested frequency band and not materially constrain future operations. So long as an applicant can make a sufficient demonstration that it can satisfy those qualifying characteristics, we do not see a reason to adopt a rule limiting the power or bandwidth that can be used by streamlined licensees as a general matter. Depending on the system design and frequency band requested, a satellite that will operate at a higher power and use a larger bandwidth than what might now be considered typical for a small satellite may have difficulty sharing with other operations. In that case, such a satellite would not be able to be licensed under the streamlined process. In other instances, perhaps there are system characteristics that would permit sharing despite the fact that a satellite would be operating at a relatively higher power and/or using a larger bandwidth.

Efficiency of Spectrum Use. SpaceX proposes that the Commission consider efficiency of spectrum use as an additional criterion for small satellite applicants seeking streamlined treatment, and suggests that the Commission give applicants proposing more spectrally-efficient systems “more expedited consideration” under the streamlined process. SpaceX expresses concern that some of the examples of indicia of sharing that the Commission listed in the NPRM,

such as small satellites operating at only certain times during the day or only at specific geographic locations, would hamper another satellite system that sought to operate at the same times or in the same locations. SpaceX suggests that, within the streamlined process, the Commission prioritize what SpaceX describes as technologically innovative approaches such as use of phased array antennas, and adaptive beam-forming strategies allowing for satellites to target narrow coverage areas more precisely and reuse spectrum many times over to maximize throughput.

We decline to adopt a separate “spectrum efficiency” qualifying characteristic or to prioritize certain types of sharing within the streamlined process. We agree with SpaceX that spectral efficiency is important. However, the approach SpaceX identifies appears to relate to more general concerns applicable beyond the streamlined small satellite process, including the processing of NGSO-like applications in processing rounds. We continue to believe that more limited types of operations should be the focus of this proceeding. We do not believe anything would be gained by establishing some type of prioritization within the streamlined process for systems with certain types of technological capability related to spectrum efficiency, although we expect that such systems will be more readily able to establish that they can operate without materially constraining other operators.

C. Application Requirements

We adopt our proposal from the NPRM to use the Form 312 and Schedule S as the basis for applications filed under the part 25 streamlined process. Commenters who addressed this issue generally support our proposals.

CSSMA suggests that we also consider allowing applicants to provide a range of operational altitudes and inclinations with their applications and to submit representative worst-

case gain contour plots for antennas. SES/O3b opposed CSSMA's proposal, arguing that orbital parameters and antenna gain contour plots are necessary for existing operators to conduct an analysis of the potential for interference posed by the small satellite system. We decline to adopt CSSMA's proposal to relax the Schedule S requirements for small satellites. While we think that it is appropriate to streamline certain parts of our rules, we continue to believe that the requirements of Form 312 and Schedule S provide necessary basic information that allows the Commission to assess the suitability of the applicant for licensing and allows other operators to assess the risk of interference posed by the system, and we decline to make modifications to Schedule S. In the event that an applicant under the streamlined process has concerns or questions about how to fill out a certain part of Schedule S, the applicant may file a supplement explaining how it completed the form or otherwise inquire with staff about how best to proceed.

Additionally, several commenters suggested that we specifically require the submission of an Orbital Debris Assessment Report. An Orbital Debris Assessment Report is a report intended to document compliance with orbital debris mitigation requirements, using a format developed for NASA missions. It is described in the NASA Standard as having fourteen sections, some of which relate to the launch vehicle. Some applicants for experimental and part 25 licenses currently submit a version of an Orbital Debris Assessment Report with their application materials, consisting of information relevant to an FCC evaluation. The information typically contained in an Orbital Debris Assessment Report is submitted to satisfy the Commission's existing orbital debris disclosure requirements, and some information in an Orbital Debris Assessment Report may be beyond what is currently required by the Commission's rules. The Orbital Debris Assessment Report usually contains, for example, a section on assessment of spacecraft debris released during normal operations, which would

include descriptive information on any object expected to be released, a section on potential for explosions, which would provide detailed plans regarding passivation and other issues, and a section on potential for in-orbit collisions, which would include a calculation using the NASA Debris Assessment Software. While the Orbital Debris Assessment Report format often includes sufficient information to satisfy FCC disclosure requirements, particularly for non-maneuverable spacecraft, it does not solicit information about some aspects of satellite operations, such as “flight plans” or the maintenance of orbital parameters via propulsion, that are identified in FCC rules. CSSMA and SIA suggest that we ask streamlined applicants to submit an Orbital Debris Assessment Report, “prepared in a manner consistent with existing part 25 rules.” CSSMA states that preparation of an Orbital Debris Assessment Report is not a significant burden to a satellite operator and provides all other operators and the Commission with detailed analysis of how the requirements are met. It notes that the free NASA Debris Assessment Software is available to assist with such analysis, and that the analysis is a critical element of ensuring the orbital debris mitigation guidelines are met. SIA notes that an Orbital Debris Assessment Report requirement would allow the Commission and other operators to review the assumptions and analysis that goes into the certifications. Relatedly, CSSI expresses concern that the standard applicant will not have the technical familiarity and subject matter expertise to certify their ability to assess collision probability. CSSI also states that the Commission should allow sophisticated applicants to use a higher fidelity approach to determining probability of collision in certain instances.

We adopt the certification process proposed in the NPRM. We decline to specify a single format, such as the Orbital Debris Assessment Report, for submitting information in response to orbital debris mitigation requirements, since we want to provide applicants with flexibility.

However, certifications should not be made casually, and applicants should ensure that certifications are made only after appropriate planning and analysis. For that reason, it is advisable for applicants to prepare an Orbital Debris Assessment Report or similar document outlining the process used to verify the accuracy of certifications. We expect that all applicants will use the NASA Debris Assessment Software or other higher fidelity modeling tools to perform the calculations necessary to address the various certifications and will maintain documentation associated with each of the certifications for inclusion in the public application file upon request. Furthermore, because the certifications will not in all circumstances address all required disclosures under our debris mitigation rules, applicants will need to submit narrative information in addition to certifications.

D. Application Processing

There is general support in the record for the proposal to exempt streamlined small satellites from the NGSO processing round procedures. We adopt our proposals related to streamlined application processing based on our understanding of the characteristics and scope of operations that generally define small satellites. In particular, as noted in the NPRM, a small satellite is typically designed to serve its purpose within a limited, relatively short period of time, and these satellites have more limited frequency use characteristics than more traditional operations licensed under part 25. An applicant under the streamlined process will not be subject to processing round procedures or default service rules.¹⁷

¹⁷ See 47 CFR 25.157 (consideration of applications for NGSO-like satellite operation); 47 CFR 25.127 (default service rules). ORBCOMM states that the *NPRM* proposed to use “first-come, first-served” approach for streamlined small satellites. ORBCOMM Comments at 6. While the new process is a first-come, first-served process in the sense that applications will be processed without establishing the “cut-off” dates used in processing rounds, the approach proposed and adopted here differs in some respects from the Commission’s first-come, first-served procedures as applied in the geostationary-orbit satellite (GSO) context. See 47 CFR 25.158. In that context, FCC rules preclude subsequent operators seeking to operate at or close to the same particular orbital location with the same coverage and in the same frequency band. See, e.g., *Amendment of the Commission’s Space Station*

Instead, we adopt the following qualifying requirement, generally as proposed in the NPRM, designed to support the exemption for these small satellites from the part 25 processing round. An applicant will be required to (a) certify that operations of its satellites will not interfere with those of existing operators, (b) certify that it will not materially constrain future operators from using the assigned frequency band(s), and (c) provide a brief narrative description illustrating the methods by which both current and future operators will not be materially constrained. We expect that the spectrum demands of systems qualifying for the streamlined process will differ substantially from the requirements for full-time system availability that characterize the NGSO systems typically processed through a processing round. Examples of applications that might satisfy these sharing requirements may include scenarios in which a satellite operates with a limited number of earth stations and downlinks during relatively short periods of time, with the ability to effectively schedule transmissions such that future satellite entrants can be accommodated. Applications that fail to adequately satisfy the sharing demonstration will be subject to dismissal, without prejudice to refiling for processing under regular part 25 procedures. We note that even if an applicant's demonstration does satisfy this qualifying criteria for streamlined processing, that does not automatically mean the application for the requested frequency bands will be granted—the proposed radiofrequency (RF) operations will be subject to further review for compliance with the Commission's rules and policies, as with a regular part 25 application, and may require coordination with other operations in the

Licensing Rules and Policies, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10795, para. 79 (2003) (68 FR 51499 (Aug. 27, 2003) and 68 FR 53702 (Sept. 12, 2003)); *compare Orbcomm License Corp.*, 23 FCC Rcd 4804, at n. 26 and para. 23 (applying a first-come first served approach, subject to accommodation of new licensees). By contrast, here there are no “orbital locations” as there are in GSO, and a small satellite operator filing subsequent to another small satellite operator in the same frequency bands will not be precluded, since the initial filer (and all subsequent filers) will have certified that its operations will not materially constrain future operators in the requested frequency bands.

band, whether those operations are commercial (including satellite and non-satellite) or Federal in nature, and may be subject to additional conditions as necessary.

We note that in the NPRM the Commission proposed that small satellite applicants be required to certify and demonstrate that they would not “unreasonably preclude” future operators from using the assigned frequency band(s). In comments, Boeing expresses concern that the “unreasonably preclude” certification standard may impose little or no practical obligation on licensees. We agree, and we find that requiring that applicants’ planned operations not “materially constrain” future entrants from using the frequency band(s) imposes a clearer obligation on licensees vis-à-vis a future satellite operator in the same band(s). For example, under an “unreasonably preclude” standard an applicant could have sought to operate in such a way that would make it impractical for future entrants to operate in the frequency band, but may argue that the preclusion is somehow “reasonable.” Under a review of whether that same applicant would impose material constraints on future entrants into the frequency band, however, it would be clear that such operations would be imposing material constraints, and the applicant would not be able to argue that it satisfies the required certification. Thus, we find that the “materially constrain” standard provides more clarity to applicants in what the Commission will consider as an adequate certification and demonstration supporting exemption from the processing round procedures. In the NPRM, the Commission described an example scenario, where a satellite operates with a limited number of earth stations for purposes of downlinking sensing data during relatively short periods of time, but still may be able to accommodate future entrants using the same frequency bands. The Commission could find that such operations would not materially constrain future entrants from using the frequency bands, even if new entrants might be unable to use the frequencies for certain periods of time at certain locations

when the earlier-licensed operator is communicating with its earth stations, and so would satisfy the requirements we adopt here.

Boeing further argues that even following authorization, a streamlined licensee should be required to make “technically feasible” changes to its system if required to facilitate sharing of scarce orbital and spectrum resources with other small commercial satellites. In Boeing’s view, non-streamlined NGSO licensees are arguably subject to a higher standard of sharing with other operators than “unreasonable preclusion,” in that they are required to “discuss their technical operations in good faith with an aim to accommodating both systems.” So long as the applicant has provided the required certifications and narrative that describes the methodology by which the system is capable of sharing with other operations and will not materially constrain future entrants in the requested frequency band, we see no reason to impose additional generalized obligations—specifically the inclusion of a “technically feasible” requirement, as Boeing suggests, in addition to the proposed certifications. It is important to note, however, that we expect the methodology for sharing to include coordination in good faith with other operators, including, if necessary, acceptance of new constraints on operations, because failing to do so would in effect be “materially constraining” other operations. We expect that the system design will also provide a basis for capability to share, alongside the fact that no more than 10 satellites will be authorized under a single license and the total term for all operations under a license will not exceed six years.

Several commenters suggest criteria for examining the sufficiency of certifications concerning impact on other operations. Iridium states that eligible small satellite applicants should not be able to obtain a license based on conclusory assertions that they will operate on a non-interference, unprotected basis but should be required to explain the technical basis for their

determination that there will be no harmful interference. We agree. The narrative statement supporting certification will require more than a conclusory assertion. A commitment to cease transmissions if interference is reported is not sufficient by itself. Instead, the narrative should provide a technical analysis to support the applicant's certification. Of course, the content and length of the narrative may vary depending on what frequency band is requested. The radiofrequency environment in a particular requested frequency band, as well as the scope and type of operations contemplated by the applicant, will inform the content of the narrative description, including whether coordination is necessary with incumbent operators. Relatedly, ORBCOMM urges the Commission to require any new small satellite system applicant to complete spectrum and orbit resource coordination before any such applicant is authorized to operate any satellites under the streamlined procedures. In a frequency band where the only viable way to share with an existing operator is through operator-to-operator coordination, we would expect that the applicant would describe the status of that coordination process and reserve the right to grant the application only after that coordination is completed.

Additionally, SIA proposes that the Commission allow applicants for the streamlined process to identify ground station requirements or ground station options, rather than specify a complete ground station plan in the narrative. According to SIA, once an applicant knows its ground station plan, it can provide the plan in a supplemental filing and/or through direct communications with other operators during the coordination process. We decline to adopt SIA's suggestion and will require that applicants provide ground station information along with their application. We appreciate SIA's interest in providing applicants with flexibility and recognize that ground station plans can sometimes change as system design evolves. However, ground station plans are an important part of the coordination process, including with Federal

users. Other operators are likely to be interested in ground station plans as well, and therefore this information is an important part of the public record for a streamlined small satellite application. We believe that this information should be made available at the outset to the fullest extent possible, even if in some instances it may need to later be revised.

We received several comments suggesting that the Commission modify public notice procedures to its standard application review processes for small satellite applications. CSSMA proposes a reduction in the public notice period for the streamlined process to 15 days and proposes that the nature of comments be limited to only those that challenge the qualifications of an operator to use the streamlined process. We decline to adopt these proposals. Under our current part 25 rules, once public notice has been issued announcing that an application has been accepted for filing, interested parties have up to 30 days to file a petition to deny, petition for other form of relief or other objections or comments. We conclude that the amount of time gained from reducing the public notice period would not be worth establishing an entirely separate set of timelines for the comment period on these streamlined applications, and might unreasonably restrict the opportunity for meaningful comment on applications.

We also decline to limit the scope of issues that comments can address as requested by CSSMA. If an interested party has a concern about something outside the scope of the streamlined characteristics, for example, the orbital parameters of a particular system, or seeks clarification on what it views as an inconsistency within an application, that interested party should be able to raise those issues within the public notice process. We also note that applications will include narrative information that addresses matters other than eligibility for the small satellite licensing process. Restricting comment concerning this information and any issues it may raise would be unreasonable.

CSSMA further requests that we institute a period of 45 days for comments to be resolved between operators following the end of the public notice period, and that in the absence of an agreement, the Commission must act to dismiss the application or dismiss the petition to deny. We believe adding this formal timeline is also unnecessary. As the Commission has stated in various arenas, including for example, in the context of NGSO operator-to-operator coordination, we expect parties to coordinate in good faith. If questions arise as to whether a party is coordinating in good faith to resolve an issue, the matter may be quickly brought to the attention of the Commission, and we will intervene to make a decision. We do not find it necessary to adopt a rule on this topic, however, since the circumstances will differ for each individual scenario.

Additionally, the University Small-Satellite Researchers and CSSMA ask that we provide additional transparency by instituting a process to enable application tracking, following the submission of an application to the Commission, for example, through the International Bureau Filing System (IBFS), for both the streamlined process and regular part 25 applications. While we understand the desire for timely feedback both on any technical issues with an application as well as on application status, we believe that our existing system is adequate and decline to make changes to our application tracking systems as part of this proceeding.

E. Interference Protection Status

The NPRM proposed that systems authorized under the streamlined process would typically receive the level of interference protection they are entitled to under the relevant service allocation in the U.S. Table of Frequency Allocations (U.S. Table). In bands where part 25 licensees have been authorized pursuant to a non-streamlined process, i.e., through a processing round, the Commission proposed that licensees under the streamlined process would be subject

to some limitations on a frequency-band specific basis, including, in appropriate circumstances, that operations are on a non-interference basis with respect to part 25 systems authorized in a processing round. The Commission also sought comment on the interference protection status of streamlined small satellites vis-à-vis non-satellite services.

Commenters generally support adoption of the Commission's proposal that systems authorized under the streamlined process would typically receive the level of interference protection they are entitled to under the relevant service allocation in the U.S. Table of Frequency Allocations (U.S. Table), and we adopt this proposal. Small satellites authorized through the streamlined procedure will in general have status consistent with the relevant service as allocated in the U.S. Table and will be subject to the same rules as a regular part 25 licensee with respect to sharing with systems operating in frequencies allocated to other services, including non-satellite services. However, we will evaluate small satellite applications filed under the streamlined procedure on a case-by-case basis, and if necessary, may impose certain other conditions to minimize adverse effects of such operations on current or potential future use of the relevant bands by satellite and non-satellite services, including the protection of, or acceptance of interference from, satellite and non-satellite services. In evaluating the effects of small satellite operations on current or potential use of the relevant bands by other services, we will evaluate the proposed operations as we would those of any other system filed under Part 25. For operations in bands shared with Federal users, conditions may also be imposed as required per coordination of the requested operations with Federal users.

With respect to the status of streamlined licensees vis-à-vis regular part 25 licensees, we also adopt the Commission's proposal that streamlined small satellites will operate on a non-

interference basis relative to regularly-authorized part 25 satellites¹⁸ operating in the same service. Some commenters state that streamlined small satellite licensees should be required to protect all regularly authorized part 25 licensees operating in any service, even if they are operating in a service with a lower allocation status. In the unlikely event that a streamlined small satellite licensee is operating in a service that has a higher status afforded by the U.S. Table than a service being used by a regularly-authorized part 25 operator, however, we would not expect that the small satellite would be required to, for example, accept harmful interference from the regular part 25 operator.

F. Revised Bond Requirement

The NPRM sought comment on the proposal to adopt a one-year “grace period,” applicable to small satellite streamlined licensees, during which the licensees would not need to post the surety bond required under the Commission’s rules. We adopt the NPRM proposal. As proposed and adopted, this grace period would begin 30 days after the license was granted. Under the existing rules, licensees for most NGSO systems are required to have a surety bond on file no later than 30 days following grant of a license or request for market access. The surety bond must initially require payment of \$1 million in the event of default, and the amount payable under the bond must steadily escalate, to a maximum of \$5 million. Under the rules, a licensee will be considered to be in default with respect to the bond if it fails to satisfy certain milestone requirements or surrenders its license before meeting an applicable milestone requirement. The

¹⁸ There is support in the record for requiring streamlined licensees to protect regular part 25 licensees or market access grantees operating in the same service, including those processed through a processing round, as well as those authorized through first-come, first-served procedures or granted waivers related to application processing. *See, e.g.,* Boeing Comments at 6. Thus, “regularly-authorized” part 25 licensees or grantees will be any satellites or systems authorized under part 25 not through the streamlined small satellite process. To the extent that any operator has concerns about interference to its authorized part 25 system, that operator may raise concerns regarding the application through the standard public notice process.

part 25 milestone rules require that a recipient of an initial authorization for an NGSO system must launch 50% of the maximum number of space stations authorized for service, place them in their assigned orbits, and operate them in accordance with the station authorization no later than 6 years after the grant of the authorization. As adopted here for streamlined small satellite systems, if by the end of the one-year grace period this milestone has been met then no bond is required.

While several commenters agree with our proposal to modify the bond requirement by adopting a grace period for streamlined small satellites, a number of commenters argue that the bond requirement should be eliminated altogether for small satellites authorized under the streamlined process. Many of these commenters contend that spectrum “warehousing” is not implicated by the streamlined process, since spectrum would be authorized on a non-exclusive basis, and therefore there is no need for the bond and milestone requirements as a deterrent to speculative applications.

We are not convinced by the argument that there is no value to having any type of bond requirement for these systems. As the Commission recently noted in a separate proceeding, unused authorizations for spectrum-orbit resources can create unnecessary coordination burdens and uncertainty for other operators. This is true even where, as under the streamlined process, the satellite operators have effectively the same status relative to each other, and the frequency assignments are non-exclusive. While some commenters allege that the application fee presents a sufficient deterrent to speculative applications in this area, we disagree, since some applicants could view a Commission license grant as an asset worth the now-reduced application fee, even though their satellite or system is far from launch.

Boeing suggests that if we do decide to retain the bond for streamlined small satellite

licensees, the grace period should be extended to two years. Boeing states that satellite operators may order long-lead items such as radio transmitters and receivers only after securing Commission authorization for particular frequency bands, and that the manufacturing time for these items combined with spacecraft assembly, testing, and scheduling of launch can easily exceed 12 months. We decline to extend the grace period to more than one year, as we believe the one-year time period provides a benefit to operators qualifying for the streamlined process and is consistent with the typically shorter development timelines for these satellites, while deterring speculative filings. Before the one-year mark, we believe a licensee should be able to assess if and when it will realistically be able to begin operations. Thus, we adopt the one-year grace period before an operator must file a bond.

Consistent with the NPRM proposal, we also conclude that following the one-year grace period, operators that have met the 50% milestone may still launch and operate additional satellites, provided that the satellite(s) can still satisfy the criteria for the streamlined process, including deorbit within the six-year license term. Licensees failing to begin operations during the one-year grace period may surrender their license to avoid the bond requirement, and would not be precluded from filing another license application. Finally, licensees launching and operating one or more satellites within the one-year grace period, but failing to launch and operate 50% of their authorized satellites within that period, may choose to either post a bond and be subject to the standard NGSO bond and milestone requirements,¹⁹ or in the case of licenses that specify multiple satellites, accept an automatic reduction in the number of

¹⁹ The applicable NGSO milestones and bond amount will be calculated from the time of license grant, thus, while a licensee has a one-year grace period from filing the bond, the licensee must secure a bond in the amount that is required one year into its license grant. *See* 47 CFR 25.165(a)(1). Similarly, the applicable milestone will be calculated beginning on the date of license grant. *See* 47 CFR 25.164(b)(1).

authorized satellites to the number actually in orbit as of the close of the grace period.

G. Technical Rules

We adopt the proposal from the NPRM that the existing generally applicable technical rules in part 25 also apply to small satellites authorized under the streamlined process. No commenters disagreed with this proposal.

H. Fees

Application Fees. We adopt the NPRM proposal and set an application fee for applicants under the part 25 streamlined process at \$30,000. At this time, we believe this application fee is a reasonable estimate of the cost of processing these types of applications. Under a recent amendment to the Communications Act (the Act), the RAY BAUM'S Act of 2018, which became effective October 1, 2018, the Commission is directed to "amend the schedule of application fees . . . if the Commission determines that the schedule requires amendment . . . so that such schedule reflects the consolidation or addition of new categories of applications." The Act states that "[t]he Commission shall assess and collect application fees at such rates as the Commission shall establish in a schedule of application fees to recover the costs of the Commission to process applications." Our preliminary estimate of the cost of processing these types of applications is approximately \$30,000. Processing these applications will include, among other things, review of the Form 312 and Schedule S, as well as review of the certifications and narrative for acceptability for filing, preparation of public notices, review of the applications on the merits and preparation of grant documents, including development of grant conditions. Applications will also require submission of ITU filings, and prior to grant many applications are likely to require coordination either with other Commission bureaus or offices and/or with Federal users. As more experience in processing these new streamlined small

satellite applications is acquired, this fee may be reviewed in the future and adjusted as necessary. However, our expectation is that review of satellite applications filed under the proposed streamlined process will be less resource-intensive than the review of a regular part 25 NGSO application, given the streamlined application process we adopt here, including lack of processing rounds.

As noted, we are adopting our proposal to make streamlined processing available for entities seeking access to the U.S. market using foreign-licensed satellites through a declaratory ruling. While in the past application fees have not applied to foreign-licensed entities seeking access to the U.S. market through a declaratory ruling, here we are adopting an entirely new regulatory process designed for small satellites, and a fee category pursuant to the recent amendments to the Act. As noted, section 8 of the Act, as revised, requires that the Commission assess and collect application fees at such rates as to “recover the costs of the Commission to process applications.” This represents a change from the prior version of section 8 of the Act, which established a schedule of fees, including specific fee categories, by statute, and did not give the Commission authority to establish new categories of application fees. Here, where we are adding a new category to the fee schedule, pursuant to our authority under section 8 as revised, the new fee we are adding should recover the processing costs associated with such applications, which will include petition for declaratory ruling applications from entities seeking to access the U.S. market using foreign-licensed satellites through the small satellite process. These filings will include the same information as applications for U.S. licenses, and can be expected to incur comparable processing costs. Therefore, in order to comply with the statute as revised, we conclude that the \$30,000 application fee will apply to entities seeking market access for small satellites under the streamlined process. The amendment of the fee schedule for small

satellites and small spacecraft within the NGSO category is an amendment to the schedule as defined in section 8(c) of the Act, which, pursuant to section 9a(b)(2), must be submitted to Congress at least 90 days before it becomes effective.

In adopting this new application fee category and application fee amount as part of this proceeding, we make an important observation. The Commission will be undertaking, as part of a separate proceeding, a comprehensive review of its application fees, which may consider, among other things, the appropriate methodologies for calculating application fees. We believe it is nonetheless appropriate to adopt a fee here, as it will permit us to begin processing applications under the small satellite process – which should ultimately yield more data on what Commission resources are required for application processing in this area. We understand there is additional work to be undertaken in this area regarding specific methodologies for calculating fees, and that, as noted above, modifications may be necessary to the \$30,000 fee adopted here as such methodologies are implemented, and the Commission gains experience processing these types of applications. The existing fee for NGSO part 25 systems, \$471,575.00, is plainly not an appropriate fee for much-less-resource-intensive review required for these systems.

No commenter opposed the proposed fee, and several commenters argued that there were powerful policy reasons for adopting a lower fee for small satellite applications. We recognize these policy rationales, while noting that the basis of our adoption of the \$30,000 fee is the estimated cost of processing the application. The University Small-Satellite Researchers would have the Commission go further, and urge us to make the streamlined process viable for educational and scientific missions and to place the application fees for small satellite applicants from educational institutions on par with the fee structure for part 5 experimental licenses. The University Small-Satellite Researchers contend that the Commission should consider holistically

the aggregate impact of both the application fee and multiple years of regulatory fees on small satellite missions. According to the University Small-Satellite Researchers, aggregating the proposed application fee along with the proposed regulatory fee for a two-year mission could result in a fee that could represent more than 15 percent of the budget of an educational satellite mission. They suggest that these costs are likely to be prohibitive for even well-resourced missions and therefore the additional interference protections and other benefits of the streamlined part 25 process will not be sufficient to enable educational institutions to shoulder the additional costs. We emphasize that the part 5 experimental licensing process will remain available for academic and research missions. We appreciate that even the much-reduced \$30,000 application fee can be significant for research missions, but we disagree with the suggestion that the Commission create a separate application fee category for a subset of licensees, such as educational institutions, within the NGSO streamlined small satellite fee category. Under section 8 of the Act, the Commission is directed to set application fees that cover the costs of the Commission to process applications, and unlike in section 9 of the Act, addressing regulatory fees, there is no general exemption from application fees for a nonprofit entity. No commenters argue that the Commission's cost in processing a certain educational or research subset of the part 25 streamlined applications will be significantly less than for a different type of small satellite streamlined application.

SIA proposes that the Commission reevaluate the streamlined process application fees one year after the process takes effect, and consider a lower application fee for those providing a non-commercial service at that time. ORBCOMM expresses concerns that the \$30,000 fee is disproportionately low as compared with the regular NGSO satellite system fee, but similarly suggests that the Commission commit to re-evaluating the application filing fees once it has

gained experience under the new streamlined processing rules, and notes that the lower fee may be acceptable in the interim. EchoStar/Hughes also suggests that once the fee is selected, the Commission revisit it within a year to determine if it properly reflects the costs of application review and processing. As noted, the Commission will be undertaking a review of application fees Commission-wide, which will provide an opportunity to reassess, if necessary, the fee amount we adopt here.

Regulatory Fees. The NPRM also noted that entities authorized to operate NGSO systems under part 25 must pay an annual regulatory fee, and proposed that comments regarding regulatory fees, as applicable to small satellites, be filed in the proceeding(s) conducted for annual review of those fees. Regulatory fees are reviewed by the Commission on an annual basis. In the regulatory fee proceeding for FY 2018, the Commission sought comment on a new regulatory fee category for small satellites and the appropriate fee associated with that category. The Commission proposed a fee that would be 1/20th of the regulatory fee applicable to part 25 NGSO systems. The Commission received a number of comments regarding the proposed category and regulatory fee as part of the FY 2018 regulatory fee proceeding. In the FY 2018 Report and Order addressing regulatory fees, the Commission deferred consideration of a new regulatory fee category, and the appropriate regulatory fee, for small satellites until a definition of “small satellites” was adopted in this proceeding.

On May 8, 2019 (84 FR 26234 (June 5, 2019)), we adopted a notice of proposed rulemaking addressing the assessment and collection of regulatory fees for FY 2019. Since the definition of “small satellites” had not yet been adopted, we did not propose a category for “small satellites” in the FY 2019 NPRM. In this proceeding we have established a definition of small satellites, and we also define and establish the new regulatory fee category applicable to

such “small satellites.” The regulatory fee for part 25 space stations applies to licensed and operational geostationary orbit space stations and non-geostationary orbit satellite systems. The new “small satellite” subcategory would apply to licensed and operational satellite systems authorized under the new process adopted in this proceeding.²⁰ Since we are creating a new category in the regulatory fee schedule that is separate from the existing fee categories, the regulatory fee will also apply to grantees of U.S. market access, similar to the small satellite application fee. Historically, the Commission has not applied regulatory fees to non-U.S.-licensed space stations granted access to the U.S. market. RAY BAUM’s Act of 2018 revised section 9, effective October 1, 2018. The new category we adopt for small satellites is created pursuant to this new version of section 9. In creating a new category, we thus establish that the existing regulatory fee for “Space Stations (Non-Geostationary Orbit)” will not apply to the operations authorized under the small satellite process. This adoption of a fee subcategory for small satellites within the NGSO category is an amendment to the schedule as defined in section 9(d) of the Act, which, pursuant to section 9a(b)(2), must be submitted to Congress at least 90 days before it becomes effective.

We defer consideration of the regulatory fee amount for this new category to the Commission’s future regulatory fee proceedings for several reasons. First, the Commission is charged with ensuring that regulatory fees will result in the collection of an amount that can reasonably be expected to equal amounts appropriated by Congress for each fiscal year. Unlike application fees, with regulatory fees the Commission allocates the total amount to be collected among the various regulatory fee categories, and a change in the regulatory fee schedule

²⁰ Accordingly, this new category would include small spacecraft non-Earth orbit missions as well. *See* section III.A. (noting that we refer to the “small satellite” process for practical purposes, but we adopt both a streamlined “small satellite” and streamlined “small spacecraft” process).

applicable to one category may affect the regulatory fees applicable to other categories. The future regulatory fee proceeding will also address how the regulatory fee will be calculated and applied to market access grantees. Second, as a practical matter there will still be ample time to assess and adopt the appropriate fee amount in the separate proceeding before any small satellites authorized under the small satellite process would be required to pay regulatory fees. For example, the annual regulatory fees due and payable in September of this year (the FY 2019 regulatory fees) for space stations must only be paid for space stations or systems that were both licensed and operational on or before the first day of the fiscal year (October 1, 2018). It is unlikely that any space stations authorized under the streamlined small satellite process will be licensed and operational on or before the first day of FY 2020 (October 1, 2019). As such, the earliest such operators are likely to be subject to regulatory fees is FY 2021—fees which would be due and payable in September 2021.

I. Frequency Considerations for Small Satellites

1. Compatibility and Sharing with Federal Users

In the NPRM, the Commission noted that many of the frequency bands where small satellites have been authorized, and where there are non-Federal allocations for services such as earth exploration-satellite service (EESS) and space operations, are shared with Federal users. The U.S. Table is divided into the Federal Table of Frequency Allocations and the non-Federal Table of Frequency Allocations, and some bands are allocated to both Federal and non-Federal uses. Additionally, some footnotes to the U.S. Table specify that use of a particular frequency band is subject to successful coordination with Federal uses of the band. As noted in the NPRM, there are procedures that generally guide frequency coordination with Federal users. The Commission sought comment on any rules that could be adopted by the Commission specific to

these frequency bands that would better enable small satellite operators to consider, in advance of coordination, whether they may be able to operate in these bands while still protecting Federal operations. The Commission sought comment on any approaches that could streamline sharing and on how the establishment of rules or other requirements on a band-specific basis might help to facilitate compatibility among separate systems and development of new types of shared and efficient uses of space and spectrum resources. The Commission noted that such rules would not necessarily replace the need to coordinate with Federal systems on a case-by-case basis, but could potentially help to streamline sharing.

In response to the Commission's inquiry, CSSMA and SIA offered several suggestions for improving coordination with Federal users, including:

- Creation of a database, on a band-by-band basis, that would reflect the “knowable” information about spectrum usage in each band.
- Mandatory pre-coordination meetings between applicants and representatives of all Federal agencies affected by a newly-filed application with the Commission.
- Formal coordination beginning concurrently with public notice.

CSSMA and SIA argue that failure of Federal agencies to act in a timely manner prejudices commercial companies by causing missed launches, lower service levels to customers, and time-to-market disadvantages.

These suggestions go beyond service rules or other requirements on a band-specific basis and contain broader suggested changes regarding processes, not currently the subject of part 25 rules and in large part involving the processes of other agencies. The suggestions also go beyond processes affecting small satellites and would potentially affect other satellite license applicants as well. We therefore decline to address these processes through rule changes within this small-

satellite focused rulemaking proceeding.

CSSMA also argues that if there is not meaningful change to the coordination process, then it recommends that critical bands be divided into sub-bands, with one sub-band available exclusively to the Federal side of U.S. Table and one sub-band available exclusively to the non-Federal side of the U.S. Table. We do not have enough information at this time to thoroughly consider CSSMA's recommendation regarding division of frequency bands into sub-bands. Such a proposal would need to be addressed on a frequency band-specific basis, likely through a separate rulemaking proceeding or proceedings, and as such, is beyond the scope of this rulemaking.

2. Spectrum Assignments for Streamlined Small Satellites

The Commission sought comment on whether the proposed streamlined process should be limited to specific frequency bands, whether the Commission should adopt a non-exclusive list of frequencies available for streamlined processing, or whether the Commission should simply consider small satellite frequency assignments on a case-by-case basis, bearing in mind the relevant frequency allocations. The NPRM highlighted several frequency bands for potential identification for use by streamlined small satellites (137-138 MHz, 148-150.05 MHz, and 1610.6-1613.8 MHz), and sought comment on the accommodation of small satellites in those bands, as well as frequency bands that could be identified for small satellite inter-satellite links.

We decline in this proceeding to adopt any new limitation on or lists of available frequencies and will consider frequencies on a case-by-case basis, subject to the same analysis for compliance with Commission rules and policies as other part 25 applicants. We anticipate, however, that applications for small satellite systems under the streamlined procedures generally will be limited to bands where there currently is an allocation for satellite services in the U.S.

Table of Allocations and in the International Table of Allocations, and that applications for other bands would require a request for waiver and an accompanying justification, as described below. Further, if such waiver requests are granted, these systems would be authorized on a non-interference basis. To the extent that any commenters argue for limitations on the frequency bands available for the streamlined process, they generally argue that frequency bands subject to a processing round or otherwise used by NGSO fixed-satellite service (FSS), mobile-satellite service (MSS), or other operations requiring full-time uninterrupted availability of spectrum should not be listed as available for streamlined processing. SpaceX and SES/O3b argue that the complexities of operations in these bands yield limited or nonexistent ability to share spectrum with all existing and future operators. On the other hand, EchoStar/Hughes does not object to small satellites operating in frequency bands allocated for FSS operations, so long as they are required to operate on a secondary, non-harmful interference basis with respect to other satellite operations. CSSMA argues that applicants should be able to apply for any frequency band that matches their category of service.

We disagree with commenters who argue that small satellites should be per se excluded from operating in frequency bands where a processing round has occurred or where there is an allocation for FSS or MSS or another service in which systems typically require full-time availability of the assigned spectrum. We do not think it is productive to adopt an outright limitation on applications requesting operations in those bands in case sharing can in some instances be accomplished because of the limited nature of the small satellite operations or other factors. We also received a number of comments on the topic of whether we should create a non-exclusive list of frequencies available for streamlined small satellites. Several commenters suggest that a list of frequencies available for small satellite could be useful either in the rules or

in a different format to provide guidance and flexibility, but CSSMA argues that a non-exclusive list of frequencies could be potentially misleading. We agree with CSSMA that such a list could be potentially misleading if applicants were to view those frequencies as quick or guaranteed options for authorization, when in fact the frequency bands most often used by small satellites to date often require coordination with Federal users and other operators. We believe operations authorized under this process may represent more varied and potentially more unique scenarios in terms of spectrum use as compared with operations we have historically authorized under part 25, but note that applicants' proposed radiofrequency obligations will be subject to Commission rules and policies, including applicable coordination obligations and potential conditions, and thus qualifying for the small satellite process does not guarantee that requested operations will be granted.

Commenters raised concerns with designation of specific frequencies for use by small satellite systems, and we conclude that a case-by-case approach, analyzed under the Commission's rules and policies on a band-specific basis, is best suited to address the varied factual scenarios that may be presented under the new process. Accordingly, we are not adopting any changes to the Table of Frequency Allocations at this time or other rule modifications regarding use of specific frequencies. Given the different types of operations that may be undertaken by "small satellites," we believe that in this instance it would be premature to adopt the rule changes prior to updates at the ITU. We are not foreclosing future proceedings, however, to implement ITU spectrum allocations.

Drawing on our experience with small satellites to date, including experiments that may transition to commercial operations, we expect that in some instances small satellite license applications may request operations not consistent with the current International Table of

Allocations. In the NPRM, the Commission observed that there may be benefits associated with such operations by small satellites in certain circumstances. Under current rules, a part 25 application is deemed not acceptable for filing if it requests authority to operate a space station in a frequency band that is not allocated internationally for such operations under the ITU Radio Regulations, regardless of whether a waiver is requested. We modify this rule to provide an exception, so that such streamlined small satellite applications requesting to operate in bands not allocated internationally, and which include an appropriate waiver request, can be considered on their merits without being deemed unacceptable for filing. There may be cases where, for example, an operator is using equipment that has been shown to successfully operate on a non-interference basis under a previous experimental license or licenses. We anticipate that we may see requests for inter-satellite link operations between small satellites and the satellites in the Globalstar or Iridium systems, for example. We will continue to treat applications for these or other space-to-space operations as non-conforming with respect to the Table of Allocations where the applicant requests to operate in satellite frequency bands allocated only for operations in the space-to-Earth or Earth-to-space directions, noting that this matter is under additional study at the ITU.

If an applicant were to request authorization for a non-conforming operation, that applicant would be required to submit a request for a waiver of the Table of Allocations, § 2.106, along with sufficient justification to support that waiver request. This process is not intended to alter the allocation status in these bands. We would also expect applicants to provide a sufficient electromagnetic compatibility analysis to support an FCC finding that the intended use of the frequency assignment will not cause harmful interference to all other stations operating in conformance with the ITU Radio Regulations. The applicant must also state its willingness to

accept an assignment on a non-interference, unprotected basis. Status as a small satellite for purposes of streamlined processing in no way guarantees that a waiver of the Table of Allocations will be granted. We anticipate that these types of uses under part 25 would be extremely limited and we would expect that such applicants would be engaged contemporaneously in activities to work toward modification of the International Table of Allocations at the ITU. Similarly, if an applicant were to request authorization for a small satellite system in a band where there is no satellite allocation in the U.S. Table of Allocations, such applications would require a waiver request and an accompanying justification. For administrative efficiency, we encourage entities that are considering making a request for authorization for a non-conforming operation to discuss the request with Commission staff prior to filing.

J. Other Issues

Responsibility for Securing Licenses. SpaceX asks the Commission to make clear that small satellite operators and their agents bear the responsibility for securing all necessary licenses prior to launch, and for providing accurate information to launch providers as to the status of such licenses. In its comments, SpaceX describes the role that parties such as small satellite aggregators, rideshare coordinators, or satellite integrators increasingly play in making launch arrangements on behalf of small satellite customers. SpaceX notes that as a launch services provider, its contracts with these types of aggregators require that all of the small satellite payloads subject to that contract have secured all relevant licenses, and that it must be able to rely on such assurances from the aggregators. This topic appears to go beyond the scope of this part 25-specific rulemaking, and relate to authorization of satellites generally, whether those satellites are authorized under the part 25 streamlined process or not. Thus, we decline in

this proceeding to adopt any rules relating to this issue. We note, however, that the Commission sought comment on issues related to multi-satellite deployments as part of its recent NPRM on orbital debris mitigation, including whether we should include in our rules any additional information requirements regarding these launches.

Rules Concerning Amateur and Experimental Satellites. The Commission did not seek comment in the NPRM on any modifications or updates to the rules governing experimental or amateur satellite licensing. The streamlined part 25 small satellite process adopted in the Report and Order is an alternative to existing license processes and does not replace or modify the authorization procedures for satellites currently contained in part 5, 25, or 97 of the Commission's rules. Nevertheless, we received a number of comments in response to the NPRM, particularly regarding the rules applicable to amateur satellite operations, suggesting that aspects of those rules be improved or clarified. These comments address topics outside the scope of this proceeding, and we decline to adopt any of the requested rule modifications or updates at this time.

IV. PROCEDURAL MATTERS

Regulatory Flexibility Act.—Pursuant to the Regulatory Flexibility Act of 1980, as amended, 5 U.S.C. 601 et seq. (RFA), the Commission's Final Regulatory Flexibility Analysis in the Report and Order is attached as Appendix B.

Paperwork Reduction Act.—This document contains modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, other Federal agencies, and the general public are invited to comment on the modified information collection requirements contained in this document. In addition, we note

that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

In this document, we have assessed the effects of reducing the application burdens of small satellite applicants, and find that doing so will serve the public interest and is unlikely to directly affect businesses with fewer than 25 employees.

In addition, this document contains proposed modified information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and the Office of Management and Budget to comment on the information collection requirements contained in this document, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

Congressional Review Act.—The Commission has determined [and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, concurs] that these rules are non-major under the Congressional Review Act, 5 U.S.C. 804(2). The Commission will send a copy of the Report & Order to Congress and the Government Accountability Office pursuant to 5 U.S.C. 801(a)(1)(A).

V. ORDERING CLAUSES

IT IS ORDERED, pursuant to sections 4(i), 7, 8, 9, 301, 303, 308, and 309 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 157, 158, 159, 301, 303, 308,

309, that the Report and Order IS ADOPTED, the policies, rules, and requirements discussed herein ARE ADOPTED, and parts 1 and 25 of the Commission's rules ARE AMENDED as set forth in Appendix A.

IT IS FURTHER ORDERED that the Report and Order contains new or modified information collection requirements that require review and approval by the Office of Management and Budget under the Paperwork Reduction Act, and WILL BECOME EFFECTIVE after the Commission publishes a document in the Federal Register announcing such approval and the relevant effective date, except for the amendments to the schedules of application and regulatory fees. The amendments to the application fee schedule WILL BECOME EFFECTIVE no earlier than 90 days following notification to Congress, in accordance with 47 U.S.C. 159A(b)(2). The amendment to the regulatory fee schedule WILL BECOME EFFECTIVE following the adoption of a fee amount for the category as part of a separate Commission rulemaking proceeding, and no earlier than 90 days following the subsequent notification to Congress, in accordance with 47 U.S.C. 159A(b)(2).

IT IS FURTHER ORDERED that the Commission SHALL NOTIFY Congress of the amendments to the application fee schedule and regulatory fee schedule pursuant to 47 U.S.C. 158(c) and 47 U.S.C. 159(d), see 47 U.S.C. 159A(b)(2).

IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of the Report and Order, including the Final Regulatory Flexibility Analyses, to the Chief Counsel for Advocacy of the Small Business Administration.

IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of the Report and Order in a report to be sent to Congress and the Government Accountability Office pursuant

to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the notice of proposed rulemaking (NPRM) released in April 2018 in this proceeding. No comments were filed addressing the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.

A. Need for, and Objectives of, the Proposed Rules.

The Report and Order adopts a number of proposals relating to the Commission's rules and policies regarding the licensing of small satellites. Adoption of these changes will, among other things, make the licensing process more accessible, decrease processing times, limit regulatory burdens, and offer protection for critical communication links, while promoting orbital debris mitigation and efficient use of spectrum.

The Report and Order adopts several changes to 47 CFR parts 1 and 25. Principally, it:

- 1) Establishes a new, optional licensing and market access process within part 25 for "small satellites" and "small spacecraft." Satellites and systems licensed under this new streamlined process will meet several qualifying criteria, which are consistent with the goals of enabling faster review of applications in order to facilitate the deployment and operation of these systems.
- 2) Modifies the Commission's part 25 processing procedures applicable to qualifying small satellite systems, so that unlike most part 25 NGSO satellite systems, qualifying small satellite systems will not be subject to processing rounds.

3) Amends the Commission's satellite surety bond policies to provide a one-year grace period, applicable to small satellite streamlined licensees, during which the licensees would not need to post the surety bond required under the Commission's rules.

4) Adopts a new application fee category for the streamlined small satellite license and market access applicants in the amount of \$30,000, and adopts a new regulatory fee category for streamlined small satellite licensees and market access grantees.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

No comments were filed that specifically addressed the IRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration

Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments. The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

D. Description and Estimate of the Number of Small Entities To Which the Rules Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules and policies, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the

term “small business” has the same meaning as the term “small business concern” under the Small Business Act. A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA). Below, we describe and estimate the number of small entity licensees that may be affected by adoption of the final rules.

Satellite Telecommunications and All Other Telecommunications.

The rules would affect some providers of satellite telecommunications services. Satellite telecommunications service providers include satellite and earth station operators. Since 2007, the SBA has recognized two census categories for satellite telecommunications firms: “Satellite Telecommunications” and “All Other Telecommunications.” Under both categories, a business is considered small if it had \$32.5 million or less in average annual receipts.

The first category of Satellite Telecommunications “comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.” For this category, Census Bureau data for 2012 show that there were a total of 333 satellite telecommunications firms that operated for the entire year. Of this total, 299 firms had annual receipts of under \$25 million, and 12 firms had receipts of \$25 million to \$49,999,999.

The second category of Other Telecommunications is comprised of entities “primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications

to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.” For this category, Census Bureau data for 2012 show that there were a total of 1,442 firms that operated for the entire year. Of this total, 1,415 firms had annual receipts of under \$25 million. Some of these “Other Telecommunications firms,” which are small entities, are earth station applicants/licensees, but since we do not adopt changes to our licensing rules specific to earth stations, we do not anticipate that these entities would be affected.

We anticipate that our rule changes may have an impact on some space station applicants and licensees. While traditionally space station applicants and licensees only rarely qualified under the definition of a small entity, some small satellite applicants and licensees applying under the streamlined process adopted in the Report and Order may qualify as small entities.

E. Description of the Projected Reporting, Recordkeeping, and Other Compliance Requirements

The Report and Order adopts several rule changes that would affect compliance requirements for space station operators. As noted above, some of these parties may qualify as small entities.

The rules adopted generally lower the compliance burden on all affected entities, including small entities. The streamlined small satellite process adopted in the Report and Order is optional, and so will not create any additional burden in terms of compliance requirements. Entities seeking to apply under existing procedures may do so. The streamlined small satellite process lowers the compliance burden by, among other things, giving qualifying applicants the opportunity to provide information by certifications rather than by narrative in many instances,

and to obtain an exemption from the Commission's processing round procedures. The Report and Order also decreases the part 25 application fees applicable to qualifying small satellites and establishes a new category for small satellite regulatory fees.

F. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in developing its approach, which may include the following four alternatives (among others):

“(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”

In the Report and Order, the Commission relaxes or removes requirements on NGSO satellite operators who qualify for the streamlined small satellite process. Applicants may submit information in the form of certifications, rather than providing detailed narrative information, in a number of instances. The application requirements for applicants seeking to apply under the streamlined small satellite process have been moved to a new rule section for easier reference. The Report and Order considers the various qualifying characteristics proposed in the NPRM, as well as possible alternatives proposed in the comments. In several instances, based on the record, the Report and Order adopts relaxed qualifying criteria. Further, small satellite applicants will not be subject to the Commission's processing round procedures, and small satellite operators will have a grace period before they must post a surety bond. The Report and Order also adopts an application fee for streamlined small satellite applicants that is significantly

reduced from the fees that would be currently applicable to applicants and licensees for NGSO systems currently under part 25.

G. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.

Small Satellite Rules Effective Date Clarification Order

The Order clarifies the effective date of certain rule changes adopted as part of the Report and Order released by the Commission on August 2, 2019 in the proceeding *Streamlining Licensing Procedures for Small Satellites*.

The Report and Order established that the effective date for the amendment to the application fee schedule, § 1.1107, would be “no earlier than 90 days following notification to Congress,” in accordance with 47 U.S.C. 159A(b)(2). On October 28, 2019 the Commission notified Congress of the amendment to the Commission’s application fee schedule, as provided in the Report and Order. The 90-day notification period, as specified in 47 U.S.C. 159A(b)(2), concluded on January 27, 2020.

Given the satisfaction of the Congressional notification period, IT IS ORDERED that the amendment to the application fee schedule specified in the Report and Order will be effective 30 days after the upcoming publication of the Report and Order in the Federal Register.

Paperwork Reduction Act OMB Approval

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507), the FCC is notifying the public that it received final OMB approval on February 27, 2020, for the information collection requirements contained in the modifications to the Commission’s rules in 47 CFR part 25.

Under 5 CFR part 1320, an agency may not conduct or sponsor a collection of information unless it displays a current, valid OMB Control Number.

No person shall be subject to any penalty for failing to comply with a collection of information subject to the Paperwork Reduction Act that does not display a current, valid OMB Control Number. The OMB Control Number is 3060-0678.

The foregoing notice is required by the Paperwork Reduction Act of 1995, Pub. L. 104-13, October 1, 1995, and 44 U.S.C. 3507.

The total annual reporting burdens and costs for the respondents are as follows:

OMB Control Number: 3060-0678.

OMB Approval Date: February 27, 2020.

OMB Expiration Date: February 28, 2023.

Title: Part 25 of the Federal Communications Commission's Rules Governing the Licensing of, and Spectrum Usage By, Commercial Earth Stations and Space Stations

Form Number: FCC Form 312, FCC Form 312-EZ, FCC Form 312-R and Schedules A, B and S.

Respondents: Business or other for-profit entities and Not-for-profit institutions.

Number of Respondents and Responses: 6,524 respondents; 6,573 responses.

Estimated Time per Response: 0.5-80 hours.

Frequency of Response: On occasion, one time, and annual reporting requirements; third-party disclosure requirement; recordkeeping requirement.

Obligation to Respond: Required to obtain or retain benefits. The Commission has statutory authority for the information collection requirements under 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721.

Total Annual Burden: 44,992 hours.

Total Annual Cost: \$16,612,586.

Nature and Extent of Confidentiality: There is no need for confidentiality pertaining to the information collection requirements in this collection.

Privacy Act Impact Assessment: No impact(s).

Needs and Uses: On August 2, 2019, the Commission released a Report and Order, FCC 19-81, in IB Docket No. 18-86, titled “Streamlining Licensing Procedures for Small Satellites” (Small Satellite Report and Order). In this Report and Order, the Commission adopted a new alternative, optional licensing process for small satellites and spacecraft, called the “Part 25 streamlined small satellite process.” This new process allows qualifying applicants for small satellites and spacecraft to take advantage of an easier application process, a lower application fee, and a shorter timeline for review than currently exists for applicants under the Commission's existing part 25 satellite licensing rules. The Commission limited the regulatory burdens borne by applicants, while promoting orbital debris mitigation and efficient use of spectrum. The Commission's action supports and encourages the increasing innovation in the small satellite sector and helps to preserve U.S. leadership in space-based services and operations. This information collection will provide the Commission and the public with necessary information about the operations of this growing area of satellite operations. While this information collection represents an overall increase in the burden hours, the increase is due to an anticipated overall increase in number of applications as a result of additional applications being filed under the streamlined process adopted in the Small Satellite Report and Order. This information collection represents a decrease in the paperwork burdens for individual operators of non-geostationary orbit (NGSO) satellites who may now qualify for streamlined processing as small satellites, and serves the public interest by streamlining the collection of information and

allowing the Commission to authorize small satellites and spacecraft under the new process established in the Report and Order.

Specifically, FCC 19-81 contains new or modified information collection requirements listed below:

(1) Space station application requirements for qualifying small satellites and small spacecraft have been specified in new §§ 25.122 and 25.123, respectively. These new sections, including the certifications, incorporate some existing information requirements from other sections, but eliminate the need for small satellite and spacecraft applicants to provide much of the information that part 25 space station applicants would typically be required to provide in narrative format under § 25.114(d). The new or modified informational requirements in §§ 25.122 and 25.123 are listed as follows:

- a. For small satellite applications filed under § 25.122, a certification that the space stations will operate in non-geostationary orbit, or for small spacecraft applications filed under § 25.123, a certification that the space station(s) will operate and be disposed of beyond Earth's orbit.
- b. A certification that the total in-orbit lifetime for any individual space station will be six years or less.
- c. For small satellite applications filed under § 25.122, a certification that the space station(s) will either be deployed at an orbital altitude of 600 km or below, or will maintain a propulsions system and have the ability to make collision avoidance and deorbit maneuvers using propulsion. This certification will not apply to small spacecraft applications filed under § 25.123.

- d. A certification that each space station will be identifiable by a unique signal-based telemetry marker distinguishing it from other space stations or space objects.
- e. A certification that the space station(s) will release no operational debris.
- f. A certification that the space station operator has assessed and limited the probability of accidental explosions resulting from the conversion of energy sources on board the space station(s) into energy that fragments the spacecraft.
- g. A certification that the probability of a collision between each space station and any other large object (10 centimeters or larger) during the orbital lifetime of the space station is 0.001 or less as calculated using current NASA software or other higher fidelity model.
- h. For small satellite applications filed under § 25.122, a certification that the space station(s) will be disposed of through atmospheric re-entry, and that the probability of human casualty from portions of the spacecraft surviving re-entry and reaching the surface of the Earth is zero as calculated using current NASA software or higher fidelity models. This certification will not apply to small spacecraft applications filed under § 25.123.
- i. A certification that operations of the space station(s) will be compatible with existing operations in the authorized frequency band(s) and will not materially constrain future space station entrants from using the authorized frequency bands.
- j. A certification that the space station(s) can be commanded by command originating from the ground to immediately cease transmissions and the licensee

will have the capability to eliminate harmful interference when required under the terms of the license or other applicable regulations.

k. A certification that each space station is 10 cm or larger in its smallest dimension.

l. For small satellite applications filed under § 25.122, a certification that each space station will have a mass of 180 kg or less, including any propellant. For small spacecraft applications filed under § 25.123, a certification that each space station will have a mass of 500 kg or less, including any propellant.

m. A description of means by which requested spectrum could be shared with both current and future operators (e.g., how ephemeris data will be shared, antenna design, earth station geographic locations) thereby not materially constraining other operations in the requested frequency bands.

n. For space stations with any means of maneuverability, including both active and passive means, a description of the design and operation of maneuverability and deorbit systems, and a description of the anticipated evolution over time of the orbit of the proposed satellite or satellites.

o. In any instances where spacecraft capable of having crew aboard will be located at or below the deployment orbital altitude of the space station seeking a license, a description of the design and operational strategies that will be used to avoid in-orbit collision with such crewed spacecraft shall be furnished at the time of application. This narrative requirement will not apply to space stations that will operate beyond Earth's orbit.

p. A list of the FCC file numbers or call signs for any known applications or Commission grants related to the proposed operations (e.g., experimental license grants, other space station or earth station applications or grants).

(2) The informational requirements listed in § 25.137 for requests for U.S.-market access through non-U.S.-licensed space stations were also modified to refer to §§ 25.122 and 25.123, for those applicants seeking U.S. market access under the small satellite or spacecraft process.

This collection is also used by staff in carrying out United States treaty obligations under the World Trade Organization (WTO) Basic Telecom Agreement. The information collected is used for the practical and necessary purposes of assessing the legal, technical, and other qualifications of applicants; determining compliance by applicants, licensees, and other grantees with Commission rules and the terms and conditions of their grants; and concluding whether, and under what conditions, grant of an authorization will serve the public interest, convenience, and necessity.

As technology advances and new spectrum is allocated for satellite use, applicants for satellite service will continue to submit the information required in 47 CFR part 25 of the Commission's rules. Without such information, the Commission could not determine whether to permit respondents to provide telecommunication services in the United States. Therefore, the Commission would be unable to fulfill its statutory responsibilities in accordance with the

Communications Act of 1934, as amended, and the obligations imposed on parties to the WTO Basic Telecom Agreement.

List of Subjects

47 CFR Part 1

Administrative practice and procedure.

47 CFR Part 25

Communications equipment, Earth stations, Radio, Reporting and recordkeeping requirements, Satellites.

Federal Communications Commission.

Marlene Dortch,
Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1 and 25 as follows:

PART 1 – PRACTICE AND PROCEDURE

1. The authority citation for part 1 continues to read as follows:

Authority: 47 U.S.C. chs. 2, 5, 9, 13; 28 U.S.C. 2461, unless otherwise noted.

2. Amend the table in § 1.1107, under “9. Space Stations (NGSO),” by redesignating paragraphs “b” through “f” as paragraphs “c” through “g” and adding a new paragraph “b” to read as follows:

§ 1.1107 Schedule of charges for applications and other filings for the international services.

* * * * *

Service	FCC Form No.	Fee amount	Payment type code
* * * * *			
9. Space Stations (NGSO):			
* * * * *			
b. Application (license or market access for small satellite or small spacecraft system)	312 Main & Schedule S & 159	30,000.00	CLW
* * * * *			

PART 25 – SATELLITE COMMUNICATIONS

3. The authority citation for part 25 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless

otherwise noted.

4. Amend § 25.103 by adding the definition of “Small satellite” and “Small spacecraft” in alphabetical order to read as follows:

§ 25.103 Definitions.

* * * * *

Small satellite. An NGSO space station eligible for authorization under the application process described in § 25.122.

Small spacecraft. An NGSO space station operating beyond Earth’s orbit that is eligible for authorization under the application process described in § 25.123.

* * * * *

5. Amend § 25.112 by revising paragraph (a)(3) to read as follows:

§ 25.112 Dismissal and return of applications.

(a) * * *

(3) The application requests authority to operate a space station in a frequency band that is not allocated internationally for such operations under the Radio Regulations of the International Telecommunication Union, unless the application is filed pursuant to § 25.122 or § 25.123.

* * * * *

6. Amend § 25.113 by revising paragraphs (h) and (i) to read as follows:

§ 25.113 Station construction, deployment approval, and operation of spare satellites.

* * * * *

(h) An operator of NGSO space stations under a blanket license granted by the Commission, except for those granted pursuant to the application process in § 25.122 or §

25.123, need not apply for license modification to operate technically identical in-orbit spare satellites in an authorized orbit. However, the licensee must notify the Commission within 30 days of bringing an in-orbit spare into service and certify that its activation has not exceeded the number of space stations authorized to provide service and that the licensee has determined by measurement that the activated spare is operating within the terms of the license.

(i) An operator of NGSO space stations under a blanket license granted by the Commission, except for those granted pursuant to the application process in § 25.122 or § 25.123, need not apply for license modification to deploy and operate technically identical replacement satellites in an authorized orbit within the term of the system authorization. However, the licensee must notify the Commission of the intended launch at least 30 days in advance and certify that its operation of the additional space station(s) will not increase the number of space stations providing service above the maximum number specified in the license.

7. Amend § 25.114 by revising paragraph (d) introductory text to read as follows:

§ 25.114 Applications for space station authorizations.

* * * * *

(d) The following information in narrative form shall be contained in each application, except space station applications filed pursuant to § 25.122 or § 25.123:

* * * * *

8. Amend § 25.117 by revising paragraph (d)(1) to read as follows:

§ 25.117 Modification of station license.

* * * * *

(d)(1) Except as set forth in § 25.118(e), applications for modifications of space station authorizations shall be filed in accordance with § 25.114 and/or § 25.122 or § 25.123, as

applicable, but only those items of information listed in § 25.114 and/or § 25.122 or §25.123 that change need to be submitted, provided the applicant certifies that the remaining information has not changed.

* * * * *

9. Amend § 25.121 by revising paragraph (a)(1), adding paragraph (a)(3), revising paragraph (d)(2), and adding paragraph (d)(3) to read as follows:

§ 25.121 License term and renewals.

(a) * * *

(1) Except for licenses for DBS space stations, SDARS space stations and terrestrial repeaters, 17/24 GHz BSS space stations licensed as broadcast facilities, and licenses for which the application was filed pursuant to §§ 25.122 and 25.123, licenses for facilities governed by this part will be issued for a period of 15 years.

* * * * *

(3) Licenses for which the application was filed pursuant to § 25.122 or § 25.123 will be issued for a period of 6 years, without the possibility of extension or replacement authorization.

* * * * *

(d) * * *

(2) For non-geostationary orbit space stations, except for those granted under § 25.122 or § 25.123, the license period will begin at 3 a.m. Eastern Time on the date when the licensee notifies the Commission pursuant to §25.173(b) that operation of an initial space station is compliant with the license terms and conditions and that the space station has been placed in its authorized orbit. Operating authority for all space stations subsequently brought into service pursuant to the license will terminate upon its expiration.

(3) For non-geostationary orbit space stations granted under § 25.122 or § 25.123, the license period will begin at 3 a.m. Eastern Time on the date when the licensee notifies the Commission pursuant to §25.173(b) that operation of an initial space station is compliant with the license terms and conditions and that the space station has been placed in its authorized orbit and has begun operating. Operating authority for all space stations subsequently brought into service pursuant to the license will terminate upon its expiration.

* * * * *

10. Add § 25.122 to read as follows:

§ 25.122 Applications for streamlined small space station authorization.

(a) This section shall only apply to applicants for NGSO systems that are able to certify compliance with the certifications set forth in paragraph (c) of this section. For applicants seeking to be authorized under this section, a comprehensive proposal for Commission evaluation must be submitted for each space station in the proposed system on FCC Form 312, Main Form and Schedule S, as described in § 25.114(a) through (c), together with the certifications described in paragraph (c) of this section and the narrative requirements described in paragraph (d) of this section.

(b) Applications for NGSO systems may be filed under this section, provided that the total number of space stations requested in the application is ten or fewer.

(1) To the extent that space stations in the satellite system will be technically identical, the applicant may submit an application for blanket-licensed space stations.

(2) Where the space stations in the satellite system are not technically identical, the applicant must certify that each space station satisfies the criteria in paragraph (c) of this section, and submit technical information for each type of space station.

(c) Applicants filing for authorization under the streamlined procedure described in this section must include with their applications certifications that the following criteria will be met for all space stations to be operated under the license:

- (1) The space station(s) will operate only in non-geostationary orbit;
- (2) The total in-orbit lifetime for any individual space station will be six years or less;
- (3) The space station(s):
 - (i) Will be deployed at an orbital altitude of 600 km or below; or
 - (ii) Will maintain a propulsion system and have the ability to make collision avoidance and deorbit maneuvers using propulsion;
- (4) Each space station will be identifiable by a unique signal-based telemetry marker distinguishing it from other space stations or space objects;
- (5) The space station(s) will release no operational debris;
- (6) The space station operator has assessed and limited the probability of accidental explosions, including those resulting from the conversion of energy sources on board the space station(s) into energy that fragments the spacecraft;
- (7) The probability of a collision between each space station and any other large object (10 centimeters or larger) during the orbital lifetime of the space station is 0.001 or less as calculated using current National Aeronautics and Space Administration (NASA) software or other higher fidelity model;
- (8) The space station(s) will be disposed of post-mission through atmospheric re-entry. The probability of human casualty from portions of the spacecraft surviving re-entry and reaching the surface of the Earth is zero as calculated using current NASA software or higher fidelity models;

(9) Operation of the space station(s) will be compatible with existing operations in the authorized frequency band(s). Operations will not materially constrain future space station entrants from using the authorized frequency band(s);

(10) The space station(s) can be commanded by command originating from the ground to immediately cease transmissions and the licensee will have the capability to eliminate harmful interference when required under the terms of the license or other applicable regulations;

(11) Each space station is 10 cm or larger in its smallest dimension; and

(12) Each space station will have a mass of 180 kg or less, including any propellant.

(d) The following information in narrative form shall be contained in each application:

(1) An overall description of system facilities, operations, and services and an explanation of how uplink frequency bands would be connected to downlink frequency bands;

(2) Public interest considerations in support of grant;

(3) A description of means by which requested spectrum could be shared with both current and future operators, (e.g., how ephemeris data will be shared, antenna design, earth station geographic locations) thereby not materially constraining other operations in the requested frequency band(s);

(4) For space stations with any means of maneuverability, including both active and passive means, a description of the design and operation of maneuverability and deorbit systems, and a description of the anticipated evolution over time of the orbit of the proposed satellite or satellites; and

(5) In any instances where spacecraft capable of having crew aboard will be located at or below the deployment orbital altitude of the space station seeking a license, a description of the design and operational strategies that will be used to avoid in-orbit collision with such crewed

spacecraft shall be furnished at time of application. This narrative requirement will not apply to space stations that will operate beyond Earth's orbit.

(6) A list of the FCC file numbers or call signs for any known applications or Commission grants related to the proposed operations (e.g., experimental license grants, other space station or earth station applications or grants).

11. Add § 25.123 to read as follows:

§ 25.123 Applications for streamlined small spacecraft authorization.

(a) This section shall only apply to applicants for space stations that will operate beyond Earth's orbit and that are able to certify compliance with the certifications set forth in paragraph (b) of this section. For applicants seeking to be authorized under this section, a comprehensive proposal for Commission evaluation must be submitted for each space station in the proposed system on FCC Form 312, Main Form and Schedule S, as described in § 25.114(a) through (c), together with the certifications described in paragraph (b) of this section and the requirements described in paragraph (c) of this section.

(b) Applicants filing for authorization under the streamlined procedure described in this section must include with their applications certifications that the following criteria will be met for all space stations to be operated under the license:

- (1) The space station(s) will operate and be disposed of beyond Earth's orbit;
- (2) The total lifetime from deployment to spacecraft end-of-life for any individual space station will be six years or less;
- (3) Each space station will be identifiable by a unique signal-based telemetry marker distinguishing it from other space stations or space objects;
- (4) The space station(s) will release no operational debris;

(5) No debris will be generated in an accidental explosion resulting from the conversion of energy sources on board the space station(s) into energy that fragments the spacecraft;

(6) The probability of a collision between each space station and any other large object (10 centimeters or larger) during the lifetime of the space station is 0.001 or less as calculated using current NASA software or higher fidelity models;

(7) Operation of the space station(s) will be compatible with existing operations in the authorized frequency band(s). Operations will not materially constrain future space station entrants from using the authorized frequency band(s);

(8) The space station(s) can be commanded by command originating from the ground to immediately cease transmissions and the licensee will have the capability to eliminate harmful interference when required under the terms of the license or other applicable regulations;

(9) Each space station is 10 cm or larger in its smallest dimension; and

(10) Each space station will have a mass of 500 kg or less, including any propellant.

(c) Applicants must also provide the information specified in § 25.122(d) in narrative form.

12. Amend § 25.137 by revising paragraphs (b) and (d)(5) to read as follows:

§ 25.137 Requests for U.S. market access through non-U.S.-licensed space stations.

* * * * *

(b) Any request pursuant to paragraph (a) of this section must be filed electronically through the International Bureau Filing System and must include an exhibit providing legal and technical information for the non-U.S.-licensed space station of the kind that § 25.114 or § 25.122 or § 25.123 would require in a license application for that space station, including but not limited to, information required to complete Schedule S. An applicant may satisfy this

requirement by cross-referencing a pending application containing the requisite information or by citing a prior grant of authority to communicate via the space station in question in the same frequency bands to provide the same type of service.

* * * * *

(d) * * *

(5) Recipients of U.S. market access for NGSO-like satellite operation that have one market access request on file with the Commission in a particular frequency band, or one granted market access request for an unbuilt NGSO-like system in a particular frequency band, other than those filed or granted under the procedures in § 25.122 or § 25.123, will not be permitted to request access to the U.S. market through another NGSO-like system in that frequency band. This paragraph (d)(5) shall not apply to recipients of U.S. market access applying under § 25.122 or § 25.123.

* * * * *

13. Amend § 25.156 by revising paragraph (d)(1) to read as follows:

§ 25.156 Consideration of applications.

* * * * *

(d)(1) Applications for NGSO-like satellite operation will be considered pursuant to the procedures set forth in § 25.157, except as provided in § 25.157(b) or (i), as appropriate.

* * * * *

14. Amend § 25.157 by revising paragraph (a) and adding paragraph (i) to read as follows:

§ 25.157 Consideration of applications for NGSO-like satellite operation.

(a) This section specifies the procedures for considering license applications for “NGSO-

like” satellite operation, except as provided in paragraphs (b) and (i) of this section. For purposes of this section, the term “NGSO-like satellite operation” means:

- (1) Operation of any NGSO satellite system; and
- (2) Operation of a GSO MSS satellite to communicate with earth stations with non-directional antennas.

* * * * *

(i) For consideration of license applications filed pursuant to the procedures described in § 25.122 or § 25.123, the application will be processed and granted in accordance with §§ 25.150 through 25.156, taking into consideration the information provided by the applicant under § 25.122(d) or § 25.123(c), but without a processing round as described in this section and without a queue as described in § 25.158.

15. Amend § 25.159 by revising paragraph (b) to read as follows:

§ 25.159 Limits on pending applications and unbuilt satellite systems.

* * * * *

(b) Applicants with an application for one NGSO-like satellite system license on file with the Commission in a particular frequency band, or one licensed-but-unbuilt NGSO-like satellite system in a particular frequency band, other than those filed or licensed under the procedures in § 25.122 or § 25.123, will not be permitted to apply for another NGSO-like satellite system license in that frequency band. This paragraph (b) shall not apply to applicants filing under § 25.122 or § 25.123.

* * * * *

16. Amend § 25.165 by revising paragraphs (a) introductory text and (e)(1) to read as follows:

§ 25.165 Surety bonds.

(a) For all space station licenses issued after September 20, 2004, other than licenses for DBS space stations, SDARS space stations, space stations licensed in accordance with § 25.122 or § 25.123, and replacement space stations as defined in paragraph (e) of this section, the licensee must post a bond within 30 days of the grant of its license. Space station licensed in accordance with § 25.122 or § 25.123 must post a bond within one year plus 30 days of the grant of the license. Failure to post a bond will render the license null and void automatically.

* * * * *

(e) * * *

(1) Is authorized to operate at an orbital location within $\pm 0.15^\circ$ of the assigned location of a GSO space station to be replaced or is authorized for NGSO operation and will replace an existing NGSO space station in its authorized orbit, except for space stations authorized under § 25.122 or § 25.123;

* * * * *

17. Amend § 25.217 by revising paragraph (b)(1) and adding paragraph (b)(4) to read as follows:

§ 25.217 Default service rules.

(b)(1) For all NGSO-like satellite licenses, except as specified in paragraph (b)(4) of this section, for which the application was filed pursuant to the procedures set forth in § 25.157 after August 27, 2003, authorizing operations in a frequency band for which the Commission has not adopted frequency band-specific service rules at the time the license is granted, the licensee will be required to comply with the technical requirements in paragraphs (b)(2) through (4) of this section, notwithstanding the frequency bands specified in these sections: §§ 25.143(b)(2)(ii)

(except NGSO FSS systems) and (iii), 25.204(e), and 25.210(f) and (i).

* * * * *

(4) For all small satellite licensees, for which the application was filed pursuant to § 25.122 or § 25.123, authorizing operations in a frequency band for which the Commission has not adopted frequency-band specific service rules at the time the license is granted, the licensee will not be required to comply with the technical requirements specified in this section.

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